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WHITE PINE BLISTER RUST CONTROL
IN THE
NORTHWESTERN REGION

January 1 to December 31, 1944

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Division of Plant Disease Control
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WHITE PINE BLISTER RUST CONTROL IN THE NORTHWESTERN REGION

January 1 to December 31, 1944

Herman E. Swanson, Regional Leader

* * * * *

1944 Field Season

White pine blister rust control work was conducted on national forests, national parks, and state and private lands during 1944 in the Northwestern Region under the general leadership and technical direction of the Bureau of Entomology and Plant Quarantine cooperating with federal, state and private agencies. Work on national forests and national parks was directly supervised by the Forest Service and National Park Service respectively. This section of the report deals with the blister rust situation in the region and is followed by reports on: (1) State and Private lands, (2) National Forests, and (3) National Parks. In addition, detailed operation reports covering individual territorial units and reports on control investigations are presented.

Progress. During 1944, a total of 37,466 acres were worked including 7,714 acres of initial and 29,752 acres of second and third working. With blister rust spreading and intensifying on many areas ahead of the establishment of control, the 1944 accomplishment in relation to what needs to be done is only a holding action at the best. Progress in 1944 was held back by the greater than normal demand for blister rust crews on fire and yet the progress surpassed that of 1943 by the small margin of 719 acres.

Labor. Teen-aged boys again made up the bulk of the field crew. Approximately 1,400 boys were employed at the peak of the season. Other types of labor were utilized in so far as possible, the most important of these being 155 German internees employed by the Forest Service. These were largely resident aliens and were the most stable labor on the project. Results on employment of Mexican Nationals were not so successful. Of three Forest Service camps manned with Mexicans, two camps were terminated after a short period and one camp operated successfully to the end of the season. The work on Glacier National Park was performed by a crew of 15 Civilian Public Service workers. The blister rust program employed 1,585 workers at the peak of the season.

Infection Conditions. Blister rust is continuing to take a heavy toll of white pine in the recently established unprotected stands. The acreage of these young stands is increasing rapidly as a result of the logging of mature stands. The year 1944 did not appear to be a favorable one for spread of the rust from ribes to pine. Similar predictions for 1942 and 1943 were accurate as field surveys and investigations failed to find any significant infections on pine originating in these years. Only a small amount of new infection on pine has occurred since the last serious spread in 1941. If past history in rust behavior repeats itself in that every fourth year represents one of extremely heavy rust spread, 1945 will be a very bad year for spread and intensification of the rust.

Scouting activities in 1944 revealed two extensions in the spread of blister rust, one on ribes and one on pine. Cronartium ribicola was found for the first time in Yellowstone National Park. Positive identification was made of the rust found on Ribes petiolare located in Clematis Gulch in the Mammoth area. Blister rust was also found on Pinus flexilis in the Two Medicine Lake area in Glacier National Park. This is the first reported infection on P. flexilis in its natural range and the first pine infection reported east of the Continental Divide in western United States. These pine infections appeared to be of 1937 origin.

Summary of Progress

In the states of Idaho, Montana and Washington, the present net control area comprises 2,615,436 acres of which 1,755,056 acres representing 67 percent have been initially worked, 401,464 acres have been given second working and 79,324 acres, third working. The acreage on maintenance amounts to 649,030 acres or 25 percent of the total control area.

The present unworked acreage amounts to 860,380 acres. Of this, 6,803 acres are in Glacier National Park and 853,577 acres in the commercial white pine area of the Inland Empire. A large portion of this unworked acreage in the Inland Empire is cutover lands, 108,468 acres being logged 1940-1944 and 248,647 acres being logged primarily in the 1930-1939 period. Approximately 239,096 acres representing 67 percent of the unworked cutover acreage are classed in a deferred status because the present condition of the areas may preclude the establishment of a new white pine crop. The condition is generally attributable to a residual stand of other species sufficient to prevent the introduction and growth of white pine seedlings. The final disposition of these areas in the blister rust control program will be dependent on the future utilization of the mixed species and the manner in which the tracts are managed. It appears that at least 116,000 acres of cutover lands will be dropped from the control area in the near future as no longer being white pine type.

Another large unworked acreage, 166,847 acres, is natural white pine reproduction established on other than cutover areas in the period 1910-1939. Approximately 73 percent, 121,843 acres, is classed in a deferred status as not being of high priority. In this acreage 54,000 acres appear not to warrant the cost of control and 15,000 acres may be dropped because of the great amount of pine infection already present.

There are 200,855 acres of mature white pine which have not been worked and are also in a deferred classification. A careful analysis of these areas should be made when an expanded field program materializes. While mature stands generally do not contain heavy ribes populations, portions of these stands often are exposed to highly susceptible ribes along stream courses and on open ridges. It is highly possible that some damaging infection is already present in localized areas which may become evident within the next 10 or 20 years. To hold damage to a minimum, these areas of mature white pine should be studied from the standpoint of when they will be logged and for those

which will not be logged within the next 20 years, a survey should be conducted to determine the ribes population and infection hazard.

In summarizing the above, approximately 562,000 acres as yet unworked are in a deferred status. The remaining 298,000 acres with 104,000 acres yet to be classified represent the maximum unworked area which may be in immediate need of control work. It must be recognized that this work load is subject to change depending upon future utilization of residual mixed timber on the cut-over areas and the extent to which white pine becomes reestablished on much of this deferred area either by natural or artificial means.

Since most of the more valuable white pine areas have received some ribes eradication work, the major problem in the region is to complete the rework necessary to establish permanent control. Control effort has been primarily directed toward this end for the last several years and the only extension of work to new areas has been to protect particularly valuable stands, many of which are young white pine on recently logged areas located on the best white pine producing land in the territory.

Two innovations were made this year in the progress tables of the Inland Empire report and the individual operation reports in order to show more adequately the net accomplishments of the control program. The first deals with the designation of "eradication types" according to year of origin and in the case of the more recently established white pine areas, whether they are a result of cutover, burn or planting. In the future, these new stands will be grouped in five-year periods according to year of origin.

In the second place, a distinction has been made between the gross acreage reported as worked in each type and the net acreage, both worked and unworked, still being retained in the control area. This was accomplished by adding a column to the all years summary of ribes eradication by types, showing the net acres remaining in the control area. In the past, these tables have merely shown the accumulative progress without regard to important changes which have occurred in the control area since the control work was started. For example, since 1923 first working has been performed on 707,431 acres supporting mature stands of white pine. At the present time 569,118 acres of these worked mature stands remain, the rest having been logged. The 138,313 acres which have been logged are now classed as cutover, a type which supports numerous ribes as a result of the logging disturbance, or have been dropped from the control area where the conditions indicated that the area would not come back to white pine. The showing of net acres together with gross acres will also account for the acreage in the various types which was dropped because the rust outstripped the progress of control or the values did not warrant further cost incurrence.

The present type designations and the listing of "net acres" remaining in the control area are a great improvement in showing the work status and also providing a more complete inventory of the control area. Tables relating to progress by land ownership deal with net acres.

Allotments and Expenditures

Allotments and expenditures are presented in this section for the Bureau of Entomology and Plant Quarantine. Similar statements are presented for the Forest Service and the National Park Service in the reports of work on National Forests and National Parks. Summaries of the expenditures for all agencies are presented in the omnibus tables following this section of the report. In these tables emergency funds also included cost of CCC work valued at \$1.50 per man-day on control work.

Bureau of Entomology and Plant Quarantine:

Allotments

<u>Federal Funds</u>	<u>Fiscal Year</u> <u>1944</u>	<u>Fiscal Year</u> <u>1945</u>
Work Project BLR-1-4	\$ 93,700.00	\$ 88,675.00
Work Project BLR-3-4	68,538.00	64,870.00
Total	<u>\$162,238.00</u>	<u>\$153,545.00</u>

Cooperative Funds*

State of Idaho	\$ 10,000.00	\$ 15,000.00
Clearwater Timber Protective Assn.	6,781.18	6,413.72
Potlatch Timber Protective Assn.	4,959.06	5,174.28
Priest Lake Timber Protective Assn.	4,259.42	4,235.26
Total	<u>\$ 25,999.66</u>	<u>\$ 30,823.26</u>

*Funds deposited or in process of transfer to U. S. Treasurer for direct expenditure by Bureau of Entomology and Plant Quarantine.

Expenditures - Calendar Year, 1944

<u>State</u>	<u>B.E.P.Q.</u> <u>BLR-1-4</u>	<u>B.E.P.Q.</u> <u>BLR-3-4</u>	<u>Federal</u> <u>Total</u>	<u>Cooperative*</u>	<u>Total</u>
Idaho	\$77,043.75	\$79,477.33	\$156,521.08	\$28,119.58	\$184,640.66
Montana	7,368.47		7,368.47		7,368.47
Washington	6,203.96		6,203.96		6,203.96
Wyoming	857.15		857.15		857.15
Total	<u>\$91,473.33</u>	<u>\$79,477.33</u>	<u>\$170,950.66</u>	<u>\$28,119.58</u>	<u>\$199,070.24</u>

*State - \$12,506.60, Private - \$15,612.98

Expenditures - 1922 to 1944

<u>State</u>	<u>Regular</u>	<u>Emergency*</u>	<u>Cooperative**</u>	<u>Total</u>
Idaho	\$1,670,143.14	\$3,472,982.33	\$322,792.11	\$5,465,917.58
Montana	227,118.34	285,153.90		512,272.24
Washington	<u>238,738.47</u>	<u>564,312.47</u>		<u>803,100.94</u>
Subtotal	\$2,136,049.95	\$4,322,448.70	\$322,792.11	\$6,781,290.76
Colorado	11,852.04	67,437.96		79,290.00
Wyoming	<u>12,171.43</u>	<u>65,391.37</u>		<u>77,562.80</u>
Subtotal	\$ 24,023.47	\$ 132,829.33		\$ 156,852.80
Grand Total	\$2,160,073.42	\$4,455,278.03	\$322,792.11	\$6,938,143.56

*Emergency funds - ERA(WPA) \$3,775,781.16, NIRA(PWA) \$679,496.87

**State - \$187,211.64, Private - \$135,580.47

TABLE 1

SUMMARY OF RIBES ERADICATION AND OTHER CONTROL WORK BY STATES AND OPERATING AGENCIES - 1944

State	Operating Agency	First Working				Second and Other workings						Acres Second Working Only		
		Acres	Ribes Destroyed	Per Acre		Acres	Ribes Destroyed	Man-Days	Per Acre					
				Man-Days	Cost				Ribes	Cost				
Idaho	BEPQ	1,531	417,441	3,440	273	2.25	\$19.31	7,874	444,279	9,051	56	1.15	\$ 9.91	3,504
	FS	3,586	263,841	3,781	74	1.05	15.17	11,451	512,241	19,436	45	1.70	24.60	5,725
	Subtotal	5,117	681,282	7,221	133	1.41	17.49	19,325	956,520	28,537	49	1.43	18.34	9,229
Montana	FS	4,684	350,741	3,587	75	.77	8.06	1,301	126,498	3,226	97	2.43	26.11	1,085
	NPS							206	33,976	204	165	.99	*1.75	162
	Subtotal	4,684	350,741	3,587	75	.77	8.06	1,507	160,474	3,430	106	2.28	22.78	1,247
Washington	FS	757	178,714		236	1.12	12.32	5,440	309,648	5,340	57	.98	10.79	2,553
	NPS							636	9,515	561	15	.88	8.88	
	Subtotal	757	178,714	849	236	1.12	12.32	6,076	319,163	5,901	53	.97	10.59	2,553
All States	BEPQ	1,531	417,441	3,440	273	2.25	19.31	7,874	444,279	9,051	56	1.15	9.91	3,504
	FS	9,027	793,296	8,217	88	.91	11.95	18,192	948,387	28,052	52	1.54	20.23	9,363
	NPS							842	43,491	765	52	.91	7.13	162
Total		10,558	1,210,737	11,657	115	1.10	\$13.14	26,903	1,436,157	37,868	53	1.41	\$16.75	13,029

State	Operating Agency	All workings						Number Camps	Number Employees	Treatment	
		Acres	Ribes Destroyed	Per Acre		Cost	Infected Pines			Man-Treated Days	
				Man-Days	Ribes Days						
Idaho	BEPQ	9,405	861,720	12,491	92	1.33	\$11.44	7	337		
	FS	15,037	776,082	23,267	52	1.55	22.35	16	354	17,133	151
	Subtotal	24,442	1,637,802	35,758	67	1.46	18.15	23	1,191	17,133	151
	FS	5,985	477,239	6,813	80	1.14	11.99	3	198		
Montana	NPS	206	33,976	204	165	.99	1.75	1	15		
	Subtotal	6,191	511,215	7,017	83	1.13	11.64	4	213		
	FS	6,197	488,362	6,189	79	1.00	10.98	4	141		
Washington	NPS	636	9,515	561	15	.88	8.83	1	40	24,621	586
	Subtotal	6,833	497,977	6,750	73	.99	10.78	5	181	24,621	586
	BEPQ	9,405	861,720	12,491	92	1.33	11.44	7	337		
All States	FS	27,219	1,741,683	36,269	64	1.53	17.43	23	1,193	17,133	151
	NPS	842	43,491	765	52	.91	7.13	2	55	24,621	586
	Total		37,466	2,646,894	49,525	71	1.32	\$15.73	32	1,585	41,754

*CPS

TABLE 2

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP - 1944

Land Ownership	First Working			Second and Other Workings				All Workings		
	Acres	Average Per Acre		Acres	Average Per Acre		Acres Second Working Only	Acres	Average Per Acre	
		Ribes	Man-Days		Ribes	Man-Days			Ribes	Man-Days
National Forests	6,772	109	1.14	17,281	49	1.51	8,645	24,053	66	1.40
National Parks				842	52	.91	162	842	52	.91
Subtotal Federal	6,772	109	1.14	18,123	49	1.48	8,807	24,895	65	1.38
State and Private	3,786	124	1.04	8,785	62	1.26	4,222	12,571	81	1.18
Grand Total	10,558	115	1.10	26,908	53	1.41	13,029	37,466	71	1.32
NATIONAL FORESTS										
Clearwater	734	63	1.78	1,367	47	1.35	214	2,151	55	1.53
St. Joe	128	145	3.66	2,857	29	2.48	455	2,985	33	2.58
Coeur d'Alene	662	41	.79	2,887	48	1.88	1,352	3,549	46	1.68
Kaniksu	2,187	136	.86	9,398	52	1.03	5,891	11,585	68	1.00
Cabinet	729	102	1.33	772	97	2.49	733	1,501	99	1.93
Kootenai	2,282	118	1.08					2,282	118	1.08
Total	6,772	109	1.14	17,281	49	1.51	8,645	24,053	66	1.40
NATIONAL PARKS										
Mt. Rainier				636	15	.88		636	15	.88
Glacier				206	165	.99	162	206	165	.99
Total				842	52	.91	162	842	52	.91
STATE AND PRIVATE LANDS										
Idaho	2,113	220	1.79	8,102	60	1.19	3,716	10,215	93	1.32
Montana	1,673	4	.09	529	97	2.46	352	2,202	27	.66
Washington				154	57	.97	154	154	57	.97
Total	3,786	124	1.04	8,785	62	1.26	4,222	12,571	81	1.18

TABLE 3

SUMMARY OF EXPENDITURES - FEDERAL AND COOPERATIVE - 1944

State	Total Federal Funds	Total Cooperative Funds (Direct and Indirect)	Grand Total All Funds	Federal Funds			
				Bureau of Entomology and Plant Quarantine Leadership and Coord. (3101)	Cooperative Ribes Erad. (3103)	Forest Service	Park Service
Idaho	\$492,651.51	\$29,119.58	\$521,771.09	\$77,043.75	\$79,477.33	\$336,130.43	
Montana	79,463.73	1,800.00	81,263.73	7,368.47		71,735.78	\$ 359.48
Washington	85,768.59	1,000.00	86,768.59	6,203.96		68,020.80	11,543.83
Wyoming	857.15	200.00	1,057.15	857.15			
Total	\$658,740.98	\$32,119.58	\$690,860.56	\$91,473.33	\$79,477.33	\$475,887.01	\$11,903.31

State	Cooperative Funds			
	Direct Aid			Indirect Aid
	State	Private	Total	
Idaho	\$13,506.60	\$15,612.98	\$29,119.58	
Montana				\$1,800.00
Washington				1,000.00
Wyoming				200.00
Total	\$13,506.60	\$15,612.98	\$29,119.58	\$3,000.00

TABLE 1A

STATUS OF RIBES ERADICATION BY STATES AND OPERATING AGENCIES - 1918-1944 (INCLUSIVE)
(Net Figures Used)

State	White Pine in Control Area Acres	Control Area (W.P.& Prot. Zones) Acres	Initially Worked Acres	Percent Initially Worked	Initially Unworked Acres	Maintenance Acres	Percent on Maintenance	Second Working Acres	Third and Other Workings Acres
Idaho	2,249,119	2,249,119	1,514,756	67	734,363	528,034	23	357,927	60,680
Montana	213,353	213,353	132,363	62	80,990	74,008	35	11,837	3,878
Washington	152,964	152,964	107,937	71	45,027	46,988	31	31,700	14,766
Subtotal	2,615,436	2,615,436	1,755,056	67	860,380	649,030	25	401,464	79,324
Colorado	206,000*	206,000	14,859	7	191,141	8,000	4	1,962	
Wyoming	251,700*	251,700	21,760	9	229,940	9,000	4		
Subtotal	457,700*	457,700	36,619	8	421,081	17,000	4	1,962	
Total	3,073,136	3,073,136	1,791,675	58	1,281,461	666,030	22	403,426	79,324

*Indefinite

STATUS OF RIBES ERADICATION BY LAND OWNERSHIP - 1918-1944 (INCLUSIVE)

Land Ownership	White Pine in Control Area Acres	Control Area (W.P.& Prot. Zones) Acres	Initially Worked Acres	Percent Initially Worked	Initially Unworked Acres	Maintenance Acres	Percent on Maintenance	Second Working Acres	Third and Other Workings Acres
National Forests R-1	1,392,369	1,392,369	1,039,204	75	354,165	381,845	27	232,312	37,242
National Forests R-2	394,000*	394,000	36,619	9	357,381	17,000	4	1,962	
National Forests R-4	27,000*	27,000			27,000				
Subtotal	1,813,369	1,813,369	1,074,823	59	738,546	398,845	22	234,274	37,242
National Parks	39,281	39,281	6,778	17	32,503	5,080	13	4,519	5,530
Indian Reservations	11,000*	11,000			11,000				
Public Domain	29,409	29,409	16,717	57	12,692	5,812	20	5,900	1,039
Total Interior Lands	79,690	79,690	23,495	29	56,195	10,892	14	10,419	6,569
Total All Federal Lands	1,893,059	1,893,059	1,098,318	58	794,741	409,737	22	244,693	43,811
State and Private Lands	1,180,077	1,180,077	693,357	59	486,720	256,293	22	158,733	35,513
Total All Lands	3,073,136	3,073,136	1,791,675	58	1,281,461	666,030	22	403,426	79,324

*Indefinite

TABLE 2A

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP - 1918-1944 (INCLUSIVE)
(Net Figures Used)

Land Ownership	First Working			Second and Other Workings			All Workings		
	Acres	Average Per Acre Ribes Man-Days		Acres	Average Per Acre Ribes Man-Days		Acres	Average Per Acre Ribes Man-Days	
National Forests R-1	1,038,204	208	.90	269,554	116	1.16	1,307,758	189	.96
National Forests R-2	36,619	41	.36	1,962	44	.34	38,581	41	.36
National Parks	6,778	219	1.28	10,049	50	.88	16,827	118	1.04
Public Domain	16,717	166	.66	6,939	126	1.18	23,656	154	.81
Total Federal Lands	1,098,318	202	.88	288,504	113	1.14	1,386,822	183	.94
State and Private Lands	693,357	174	.68	194,246	142	1.00	887,603	167	.75
Total	1,791,675	191	.80	482,750	125	1.09	2,274,425	177	.86
NATIONAL FORESTS									
Clearwater	150,270	259	.84	54,207	138	1.03	204,477	227	.89
St. Joe	215,376	322	1.04	91,719	113	1.29	307,095	260	1.11
Coeur d'Alene	305,363	184	1.12	54,356	125	1.37	359,719	175	1.16
Kaniksu	257,086	146	.66	58,312	90	.85	315,398	135	.70
Cabinet	61,542	170	.81	9,795	117	1.32	71,337	164	.88
Kootenai	48,567	72	.55	1,165	93	.95	49,732	72	.56
Subtotal Region 1	1,038,204	208	.90	269,554	116	1.16	1,307,758	189	.96
Region 2	36,619	41	.36	1,962	44	.34	38,581	41	.36
Total	1,074,823	202	.89	271,516	115	1.15	1,346,339	185	.94
NATIONAL PARKS									
Mount Rainier	3,581	284	1.32	9,026	34	.85	12,607	105	.99
Glacier	3,197	145	1.22	1,023	187	1.14	4,220	156	1.20
Total	6,778	219	1.28	10,049	50	.88	16,827	118	1.04
STATE AND PRIVATE LANDS									
Idaho	651,247	170	.66	174,851	132	.98	826,098	163	.73
Montana	19,017	131	.71	3,732	135	1.53	22,749	132	.84
Washington	23,093	332	1.10	15,663	224	1.10	38,756	290	1.10
Total	693,357	174	.68	194,246	142	1.00	887,603	167	.75

TABLE 3A

SUMMARY OF RIBES ERADICATION BY STATES, OPERATING AGENCIES AND WORKINGS 1918-1944 (INCLUSIVE)
(Gross Figures Used)

State	Operating Agency	First Working			Second Working		
		Acree	Ribes Destroyed	Man-Day	Acree	Ribes Destroyed	Man-Day
Idaho	BEPQ	780,048	129,949,114	517,897	144,581	21,208,853	136,541
	Forest Service	884,923	198,051,822	839,536	216,693	26,405,717	247,014
	Subtotal	1,664,971	328,000,936	1,357,433	361,274	47,614,570	383,555
Montana	BEPQ	65,469	5,913,038	30,728	1,961	565,047	2,577
	Forest Service	67,697	11,089,853	62,448	9,125	989,462	13,344
	Park Service	3,197	464,555	3,905	979	167,950	1,051
Washington	Subtotal	136,363	17,467,446	97,081	12,065	1,722,459	16,972
	BEPQ	48,156	14,422,701	46,892	11,920	2,634,166	12,212
	Forest Service	69,359	12,898,479	49,487	18,407	2,117,807	14,270
Colorado	Park Service	8,254	1,640,507	10,070	4,327	400,913	5,941
	Subtotal	125,769	28,961,687	106,449	34,654	5,152,886	32,423
	BEPQ	14,859	410,649	6,292	1,962	86,886	664
Wyoming	BEPQ	21,760	1,085,771	6,940			
All States	BEPQ	930,292	151,781,273	608,749	160,424	24,494,952	151,994
	Forest Service	1,021,979	222,040,154	951,471	244,225	29,512,986	274,628
	Park Service	11,451	2,105,062	13,975	5,306	568,863	6,992
Total		1,963,722	375,926,489	1,574,195	409,955	54,576,801	433,614

State	Operating Agency	Third and Other Workings			All Workings				
		Acree	Ribes Destroyed	Man-Day	Acree	Ribes Destroyed	Man-Days	Average Per Acre Ribes	Man-Days
Idaho	BEPQ	23,138	2,428,808	26,716	947,767	153,586,775	681,154	162	.72
	Forest Service	38,149	3,283,842	56,537	1,139,765	227,741,381	1,143,087	200	1.00
	Subtotal	61,287	5,712,650	83,253	2,087,532	381,328,156	1,824,241	183	.87
Montana	BEPQ	648	59,040	777	68,078	6,537,125	34,082	96	.50
	Forest Service	3,186	182,153	3,348	80,008	12,261,468	79,140	153	.99
	Park Service	44	23,718	116	4,220	656,223	5,072	156	1.20
Washington	Subtotal	3,878	264,911	4,241	152,306	19,454,816	118,294	128	.78
	BEPQ	4,681	768,915	4,036	64,757	17,825,782	63,140	275	.98
	Forest Service	4,599	304,124	3,796	92,365	15,320,410	67,553	166	.73
Colorado	Park Service	5,706	154,777	4,840	18,287	2,196,197	20,851	120	1.14
	Subtotal	14,986	1,227,816	12,672	175,409	35,342,399	151,544	201	.86
	BEPQ				16,821	497,535	6,956	30	.41
Wyoming	BEPQ				21,760	1,085,771	6,940	50	.32
All States	BEPQ	28,467	3,256,763	31,529	1,119,183	179,532,988	792,272	160	.71
	Forest Service	45,934	3,770,119	63,681	1,312,138	255,323,259	1,289,780	195	.98
	Park Service	5,750	178,495	4,956	22,507	2,852,420	25,923	127	1.15
Total		80,151	7,205,377	100,166	2,453,828	437,708,667	2,107,975	178	.86

TABLE 4A

SUMMARY OF ALL OTHER CONTROL WORK BY STATES AND OPERATING AGENCIES 1918-1944 (INCLUSIVE)
(Gross Figures Used)

State	Operating Agency	Cultivated Black Currants Destroyed	Treatment Infected Pines		Nursery Sanitation				
			Pine Treated	Man-Days	Nurseries Worked	Acres Worked	Ribes Destroyed	Man-Day	Number of Nurseries Retaining Protective Zones Dropping Protective Zones
Idaho	BEPQ	16,553	1,746,393	4,307					
	Forest Service		27,905	187					
	Subtotal	16,553	1,774,298	4,494					
Montana	BEPQ	5,080			1 *	6,486	1,265,602	6,513	1
	Forest Service		67,208	1,189	(1)*	2,905	271,121	1,406	(1)
	Subtotal	5,080	67,208	1,189	1	9,391	1,536,723	7,919	1
Washington	BEPQ	78,226	126,372	221	1	378	20,275	640	1
	Forest Service		133,300	224					
	Park Service		36,432	1,075					
Wyoming	Subtotal	78,226	296,104	1,520	1	378	20,275	640	1
	BEPQ				1	2,038	73,786	567	1
	BEPQ	99,859	1,872,765	4,528	3	8,902	1,359,663	7,720	2
All States	Forest Service		228,413	1,600	(1)	2,905	271,121	1,406	(1)
	Park Service		36,432	1,075					
	Subtotal	99,859	2,137,610	7,203	3	11,807	1,630,784	9,126	2
Total									

*Savenac Nursery

TABLE 5A

SUMMARY OF ALL RIBES ERADICATION BY STATES, OPERATING AGENCIES AND PROGRAMS 1918-1944 (INCLUSIVE)
(Gross Figures Used)

State	Operating Agency	Regular and Cooperative			All Emergency Programs			Totals		
		Acres	Ribes	Man-Days	Acres	Ribes	Man-Days	Acres	Ribes	Man-Days
Idaho	BEPQ	248,855	25,777,104	127,462	698,912	127,809,671	553,692	947,767	153,586,775	681,154
	Forest Service	395,452	78,310,468	414,746	744,313	149,430,913	728,341	1,139,765	227,741,391	1,143,087
	Subtotal	644,307	104,087,572	542,208	1,443,225	277,240,584	1,282,033	2,087,532	381,328,156	1,824,241
Montana	BEPQ	2,002	761,710	3,295	66,076	5,775,415	30,787	68,078	6,537,125	34,082
	Forest Service	29,821	3,421,736	31,080	50,187	8,839,732	48,060	80,008	12,261,468	79,140
	Park Service	993	159,761	1,064	3,227	496,462	4,008	4,220	656,223	5,072
	Subtotal	32,816	4,343,207	35,439	119,490	15,111,609	82,855	152,306	19,454,816	118,294
Washington	BEPQ				64,757	17,825,782	63,140	64,757	17,825,782	63,140
	Forest Service	33,671	7,819,917	28,462	58,694	7,500,493	39,091	92,365	15,320,410	67,553
	Park Service	7,327	903,030	8,159	10,960	1,293,167	12,692	18,287	2,196,197	20,851
	Subtotal	40,998	8,722,947	36,621	134,411	26,619,442	114,923	175,409	35,342,389	151,544
Colorado	BEPQ				16,821	497,535	6,956	16,821	497,535	6,956
Wyoming	BEPQ				21,760	1,085,771	6,940	21,760	1,085,771	6,940
All States	BEPQ	250,857	26,538,814	130,757	868,326	152,994,174	661,515	1,119,183	179,532,988	792,272
	Forest Service	458,944	89,552,121	474,288	853,194	165,771,138	815,492	1,312,138	255,323,259	1,289,780
	Park Service	8,320	1,062,791	9,223	14,187	1,789,629	16,700	22,507	2,852,420	25,223
Total		718,121	117,153,726	614,268	1,735,707	320,554,941	1,493,707	2,453,828	437,708,667	2,107,975

TABLE 6A

SUMMARY OF ALL EXPENDITURES 1918-1944 (INCLUSIVE)
(Gross Figures Used)

State	Total Federal Funds		Total Cooperative Funds	Grand Total All Funds	Regular Funds		
	Regular	Emergency			Bureau (B. P. I. & E. P. Q.)	Forest Service	Park Service
Idaho	\$5,283,733.17	\$6,270,021.33	\$552,103.11	\$12,105,857.61	\$1,670,143.14	\$3,613,590.03	
Montana	566,071.00	594,772.92	113,300.00	1,274,143.92	227,118.34	328,747.42	\$10,205.24
Washington	582,812.93	755,582.95	80,000.00	1,418,395.88	238,788.47	278,083.56	65,935.90
Subtotal	6,432,617.10	7,620,377.20	745,403.11	14,798,397.41	2,136,049.95	4,220,426.01	76,141.14
Colorado	11,852.04	67,437.96	11,700.00	90,990.00	11,852.04		
Wyoming	12,171.43	65,391.37	4,900.00	82,462.80	12,171.43		
Subtotal	24,023.47	132,829.33	16,600.00	173,452.80	24,023.47		
Total	\$6,456,640.57	\$7,753,206.53	\$762,003.11	\$14,971,850.21	\$2,160,073.42	\$4,220,426.01	\$76,141.14

State	Cooperative Funds			
	Direct Aid			Indirect Aid
	State	Private	Total	
Idaho	\$190,209.64	\$135,582.47	\$325,792.11	\$226,311.00
Montana				113,300.00
Washington				80,000.00
Subtotal	190,209.64	135,582.47	325,792.11	419,611.00
Colorado				11,700.00
Wyoming				4,900.00
Subtotal				16,600.00
Total	\$190,209.64	\$135,582.47	\$325,792.11	\$436,211.00

Cooperative Blister Rust Control on State and Private Lands
(Work Project BLR-3-4)

Cooperative ribes eradication in 1944 on state and privately-owned lands under the provision of the Lea Act was again confined to the state of Idaho. State and private funds contributed for this work were deposited with the United States Treasurer and used in conjunction with federal funds administered by the Bureau of Entomology and Plant Quarantine. Work under this project was confined to lands within the Clearwater, Potlatch and Priest Lake Timber Protective Associations.

The field project included 7 camps with a total of 337 workers, who were largely teen-age boys, 16 and 17 years old. The camps and workers were distributed as follows: Clearwater 3 camps, 106 workers; Potlatch 2 camps, 130 workers; Priest Lake 2 camps, 101 workers.

The results of the 1944 program and the net progress on state and private lands are presented in the following tabulations:

1. Expenditures - Calendar Year 1944

<u>Association</u>	<u>State and Private</u>	<u>Federal (BLR-3-4)</u>	<u>Total</u>
Clearwater	\$11,017.17	\$26,003.64	\$37,020.81
Potlatch	8,555.16	29,670.88	38,226.04
Priest Lake	<u>8,547.25</u>	<u>23,802.81</u>	<u>32,350.06</u>
Total	\$28,119.58*	\$79,477.33	\$107,596.91

*State \$12,506.60, private \$15,612.98.

Cash expenditures from cooperative funds deposited with U. S. Treasury, 1928-1944; State \$187,211.64, Private \$135,580.47, Total \$322,792.11.

2. Cooperative Ribes Eradication in Idaho, 1944

<u>Association</u>	<u>Acres Worked</u>			<u>Man-Days</u>	<u>Ribes Destroyed</u>	<u>Per Acre</u>	
	<u>Initial</u>	<u>Rework</u>	<u>Total</u>			<u>Man-Days</u>	<u>Ribes</u>
Clearwater	576	2,738	3,314	4,616	439,830	1.39	133
Potlatch	633	2,890	3,523	4,256	138,136	1.21	39
Priest Lake	<u>322</u>	<u>2,246</u>	<u>2,568</u>	<u>3,619</u>	<u>283,754</u>	<u>1.41</u>	<u>110</u>
Total	1,531	7,874	9,405	12,491	861,720	1.33	92

3. Cooperative Ribes Eradication in Idaho, 1928-1944

<u>Association</u>	<u>Acres Worked</u>			<u>Man-Days</u>	<u>Ribes Destroyed</u>	<u>Per Acre</u>	
	<u>Initial</u>	<u>Rework</u>	<u>Total</u>			<u>Man-Days</u>	<u>Ribes</u>
Clearwater	24,581	16,245	40,826	34,022	5,508,754	.83	135
Potlatch	18,691	14,909	33,600	27,806	4,588,241	.83	137
Priest Lake	<u>111,741</u>	<u>13,704</u>	<u>125,445</u>	<u>45,166</u>	<u>10,637,809</u>	<u>.36</u>	<u>85</u>
Total	155,013	44,858	199,871	106,994	20,734,804	.54	104

4. State and Private Lands Worked in 1944

<u>State</u>	<u>Acres Worked</u>			<u>Total</u>
	<u>First</u>	<u>Second</u>	<u>Third</u>	
Idaho	2,113	3,716	4,386	10,215
Montana	1,673	352	177	2,202
Washington	_____	<u>154</u>	_____	<u>154</u>
Total	3,786	4,222	4,563	12,571

5. Progress on State and Private Lands, 1923-1944 (Net Acres)

<u>State</u>	<u>First</u>	<u>Acres Worked</u>		<u>Acres Unworked</u>	<u>Total Acres</u>
		<u>Second</u>	<u>Third</u>		
Idaho	651,247	145,570	29,281	465,048	1,116,295
Montana	19,017	2,181	1,551	16,345	35,362
Washington	<u>23,093</u>	<u>10,982</u>	<u>4,681</u>	<u>5,327</u>	<u>28,420</u>
Total	693,357	158,733	35,513	486,720	1,180,077

The status of blister rust control on state and private lands has not changed materially from conditions described in previous reports. The work project has not been of sufficient size in recent years to perform all the work that is urgent with the result that pine infection is becoming very severe in many areas. The amount of cutover area is increasing and the protection of the new white pine coming in on these areas is one of the major problems at the present time.

A significant change in the private and state land acreage in the blister rust control area in the state of Washington was caused by the transfer of approximately 30,000 acres from private to federal ownership. Most of this acreage involved the Northern Pacific holdings on the Kaniksu National Forest which were acquired by the Forest Service. Ribes eradication had been performed on 21,867 acres. There remain only 35,362 acres of state and privately owned land in the white pine control area in Washington which is about evenly

divided between the Kaniksu and Mount Spokane operations. No work has been performed on the latter operation since the termination of WPA project work in 1941.

There are 1,180,077 acres of state and privately-owned lands in the white pine control area of which 693,357 acres have been initially worked, 158,733 acres worked twice and 35,513 acres worked three times. Twenty-two percent of the control area amounting to 256,293 acres is classed on a maintenance basis.

Blister Rust Control on National Forests
(Financial Project BLR-4)

Blister rust control was conducted by the Forest Service in Region One on six national forests. Available labor was not sufficient to build up the project on all forests to the desired strength. Boys, 16 and 17 years of age, were the main source of labor. German internees, 155 in number, employed on the Kaniksu were the most stable labor. Of three crews of Mexican Nationals secured in midseason and assigned to the St. Joe, Kaniksu and Clearwater, only the crew on the St. Joe was satisfactory, the other two being almost immediately transferred to other work.

The number of camps and approximate number of workers on each forest project were as follows:

<u>National Forest</u>	<u>Number of Camps</u>	<u>Number of Workers</u>
Clearwater	3	136
St. Joe	5	270
Coeur d'Alene	4	221
Kaniksu	8	368
Cabinet	2	122
Kootenai	<u>1</u>	<u>76</u>
Total	23	1,193

The need for Forest Service blister rust crews for fighting forest fires was much greater than in previous years and resulted in a serious loss of time from ribes eradication work. This loss is particularly important because of the short period the boys are available. Other factors, including favorable weather conditions, less labor turnover, and the long period over which the German internees were available, contributed to a more productive season than 1943 to the extent of 1,479 more acres worked and securing 2,936 more effective man-days.

Forest Service crews in 1944 worked 27,219 acres of which 9,027 acres were first working, 9,363 acres second working and 8,829 acres third working.

The present work status on national forest lands in Region One is as follows: first working 1,038,204 acres; second working 232,312 acres; third working 37,242 acres; and 354,165 acres are unworked. There are 1,392,369 acres in the control area with 381,845 acres, amounting to 27 percent, on a maintenance basis.

There is no material change in the blister rust situation on national forest lands from that described in the 1943 report. In the general approach to handling the blister rust problem, increased attention is being given to the incorporation of methods unfavorable to ribes germination and survival into timber management practices. In cutting methods and in treatment of areas following logging, two elements, shade and fire, may be employed to minimize

the ribes problem. In this connection, the Bureau of Entomology and Plant Quarantine has carried on control investigations and is initiating additional studies.

Two important field conferences and inspections were made to consider these problems. The first of these was on the Lick Creek timber sale area near Avery, Idaho. Several representatives of the Forest Service, Bureau of Entomology and Plant Quarantine, and Potlatch Forests, Inc., spent three days on this area considering marking and cutting methods in various sites and type conditions. A second field inspection of cutting practices and conditions on cutover lands was made on the Kaniksu and Coeur d'Alene Forests by E. E. Carter and A. G. Lindh of the Forest Service, accompanied by members of the Bureau of Entomology and Plant Quarantine and the forest supervisor on each forest and members of his staff. These field inspections served to direct attention to possible changes in cutting practices which will reduce the blister rust factor.

The following tabulations present the expenditures and accomplishments of the Forest Service program and the present work status on National Forest lands:

1. Allotments to U. S. Forest Service Region One

Fiscal year 1944 \$550,000.00
Fiscal year 1945 722,100.00

2. Expenditures - Calendar Year 1944

Clearwater	\$ 61,316.38
St. Joe	116,657.36
Coeur d'Alene	85,656.69
Kaniksu	140,520.80
Cabinet	45,235.78
Kootenai	26,500.00
Total	<u>\$475,887.01</u>

3. Expenditures, 1930-1944

	<u>Regular</u>	<u>Emergency*</u>	<u>Total</u>
Clearwater	\$ 820,485.57	\$ 413,454.80	\$1,233,940.37
St. Joe	1,647,053.55	383,340.06	2,030,393.61
Coeur d'Alene	759,846.19	669,809.81	1,429,656.00
Kaniksu	664,293.28	458,055.36	1,122,348.64
Cabinet	263,171.28	258,476.52	521,647.80
Kootenai	<u>65,576.14</u>	<u>28,233.00</u>	<u>93,809.14</u>
Total	\$4,220,426.01	\$2,211,369.55	\$6,431,795.56

*ERA(WPA) \$558,006.65; NIRA(PWA) \$1,653,362.90

4. Ribes Eradication by Forest Service Crews, 1944

<u>Forest</u>	<u>Acres Worked</u>			<u>Man-Days</u>	<u>Ribes Destroyed</u>	<u>Per Acre</u>	
	<u>Initial</u>	<u>Rework</u>	<u>Total</u>			<u>Man-Days</u>	<u>Ribes</u>
Clearwater	794	1,395	2,189	3,583	146,903	1.64	67
St. Joe	78	2,497	2,575	7,111	87,298	2.76	34
Coeur d'Alene	662	2,887	3,549	5,965	164,667	1.68	46
Kaniksu	2,809	10,112	12,921	12,797	865,576	.99	67
Cabinet	2,358	1,301	3,659	4,294	202,366	1.17	55
Kootenai	2,326		2,326	2,519	274,873	1.08	118
Total	9,027	18,192	27,219	36,269	1,741,683	1.33	64

5. Ribes Eradication by Forest Service Crews, 1930-1944

<u>Forest</u>	<u>Acres Worked</u>			<u>Man-Days</u>	<u>Ribes Destroyed</u>	<u>Per Acre</u>	
	<u>Initial</u>	<u>Rework</u>	<u>Total</u>			<u>Man-Days</u>	<u>Ribes</u>
Clearwater	188,683	51,228	239,911	215,587	54,913,381	.90	229
St. Joe	261,138	108,810	369,948	413,690	94,353,697	1.12	255
Coeur d'Alene	275,532	58,435	333,967	391,557	57,715,661	1.17	173
Kaniksu	228,929	59,375	288,304	189,806	36,079,052	.66	125
Cabinet	45,542	11,040	56,582	61,938	10,206,233	1.09	180
Kootenai	22,155	1,271	23,426	17,202	2,055,235	.73	88
Total	1,021,979	290,159	1,312,138	1,289,780	255,323,259	.98	195

6. Ribes Eradication on National Forest Lands, 1923-1944

<u>Forest</u>	<u>Net Acres Worked</u>			<u>Acres Unworked</u>	<u>Total Acres</u>
	<u>First</u>	<u>Second</u>	<u>Third</u>		
Clearwater	150,270	49,274	4,933	50,082	200,352
St. Joe	215,376	76,916	14,803	96,832	312,208
Coeur d'Alene*	305,363	45,827	8,529	50,138	355,501
Kaniksu	257,086	51,618	6,694	99,271	356,357
Cabinet	61,542	7,512	2,283	12,052	73,594
Kootenai	48,567	1,165		45,790	94,357
Total	1,038,204	232,312	37,242	354,165	1,392,369

*Includes national forest land on Mount Spokane operation.

Region 2. First working 36,619 acres; second working 1,962 acres.

Blister Rust Control on National Parks
(Financial Project BLR-5)

Blister rust control operations were carried on by the National Park Service in 1944 on Mount Rainier and Glacier National Parks. Also, a scouting project was conducted by the Bureau of Entomology and Plant Quarantine, under the leadership of M. C. Riley, to determine any spread of the rust into Yellowstone or Grand Teton National Parks.

Mount Rainier. A crew of 40 boys performed ribes eradication and canker elimination work in 1944. Third working was performed on 636 acres which supported an average of 15 ribes per acre. Approximately half of the effective time was spent on canker elimination in which 24,621 trees were treated requiring 586 man-days. The net control has been reduced to 3,581 acres comprising the Longmire-Silver Forest unit and the White River unit. This entire acreage has received at least two workings and approximately 2,600 acres are on a maintenance basis.

Glacier. A crew of 15 Civilian Public Service employees was engaged on ribes eradication for a short period in 1944, covering 206 acres, all of which represented second and third working. Ribes averaged 165 per acre. Initial ribes eradication has been performed on 3,197 acres and rework on 1,023 acres. While 10,000 acres have been listed as a tentative control area, the National Park Service has selected areas comprising only 3,197 acres, all of which have received initial treatment for protection from blister rust. Other areas are being considered but no decision has been made as to their inclusion in the control area. Blister rust infection was found for the first time on limber pine in the Two Medicine Lake area. Five cankers, probably of 1937 origin, were found. The only other pine infection on control areas in the park is that previously reported on the Lake MacDonald area. It is known that infection occurs in varying amounts on western white pine in areas not included in the control area.

Scouting for Blister Rust in Yellowstone and Grand Teton National Parks. In September 1944, a crew of four men inspected ribes and white pines in and adjacent to Yellowstone and Grand Teton National Parks, in order to ascertain any spread or development of the rust in this territory. Infection had been found on Ribes petiolare in 1937 on Bear Creek in the Gallatin National Forest approximately 19 miles from the northwest corner of Yellowstone National Park but scouting in 1941 had failed to reveal any extension of the disease.

In Yellowstone National Park attention was centered on those areas where control work has been contemplated or on areas where heavy concentrations of R. petiolare were known to occur. Good scouting samples were secured on the following areas: Mt. Washburn, Carnelian Creek, Gibbon River, Firehole Lake, Midway Geyser Basin, Craig Pass, Sylvan Pass, Glenn Creek, Lava Creek and Geode Creek. The only white pine blister rust found was on about 20 leaves from two R. petiolare bushes on Clematis Gulch in the Mammoth area.

In Grand Teton National Park scouting was conducted on R. petiolare on Cascade Creek and on R. petiolare and R. viscosissimum on the west side of Jenny Lake. No white pine blister rust was found.

Adjacent to Yellowstone National Park scouting was done on Tom Miner and Mol Heron Creeks in the Absaroka National Forest with negative results. On Bear Creek in the Gallatin National Forest infection was prevalent on R. petiolare.

In both cases where infected ribes were located, the associated white pine were examined but no pine infection was discovered. In connection with this scouting work pinon pine rust (Cronartium occidentale) specimens were found on the Mammoth, Mol Heron, Tom Miner and Jenny Lake areas. All specimen determinations were made by the Division of Forest Pathology.

This is the first time white pine blister rust has been found in Yellowstone National Park and means that the limber pine stand at Mammoth is definitely threatened.

Summary of blister rust control work on National Parks.

1. Allotments and Expenditures by National Park Service

<u>National Park</u>	<u>Allotments</u>	<u>Expenditures</u>	
	<u>Fiscal Year</u> 1945	<u>Calendar</u> <u>Year 1944</u>	<u>All</u> <u>Years</u>
Mount Rainier	\$19,600.00	\$11,543.83	\$65,935.90
Glacier	<u>500.00</u>	<u>359.48</u>	<u>10,205.24</u>
Total	\$20,100.00	\$11,903.31	\$76,141.14

2. Ribes Eradication on National Parks, 1944

<u>National Park</u>	<u>Acres Worked</u>			<u>Man-Days</u>	<u>Ribes</u> <u>Destroyed</u>	<u>Per Acre</u>	
	<u>Second</u>	<u>Third</u>	<u>Total</u>			<u>Man-Days</u>	<u>Ribes</u>
Mount Rainier		636	636	561	9,515	.88	15
Glacier	<u>162</u>	<u>44</u>	<u>206</u>	<u>204</u>	<u>33,976</u>	<u>.99</u>	<u>165</u>
Total	162	680	842	765	43,491	.91	52

3. Gross Acreage Worked on National Parks, 1930-1944

<u>National Park</u>	<u>Acres Worked</u>				<u>Total</u>	<u>Man-Days</u>	<u>Ribes Destroyed</u>	<u>Per Acre</u>	
	<u>First</u>	<u>Second</u>	<u>Third and Other</u>	<u>Days</u>				<u>Ribes</u>	
Mount Rainier	8,254	4,327	5,706	18,287	20,851	2,196,197	1.14	120	
Glacier	<u>3,197</u>	<u>979</u>	<u>44</u>	<u>4,220</u>	<u>5,072</u>	<u>656,223</u>	<u>1.20</u>	<u>156</u>	
Total	11,451	5,305	5,750	22,507	25,923	2,852,420	1.15	127	

4. Work Status in Net Control Area

<u>National Park</u>	<u>Acres Worked</u>			<u>Acres Unworked</u>	<u>Total Acres Control Area</u>
	<u>First</u>	<u>Second</u>	<u>Third and Other</u>		
Mount Rainier	3,581	3,540	5,486		3,581
Glacier	3,197	979	44	6,803	10,000
Yellowstone				12,900	12,900
Grand Teton				5,800	5,800
Rocky Mountain				7,000	7,000
Total	6,778	4,519	5,530	32,503	39,281

BLISTER RUST CONTROL, INLAND EMPIRE, 1944

By

Frank O. Walters
Assistant Regional Leader

The white pine lands of Northern Idaho, Eastern Washington and Western Montana are considered as the Inland Empire portion of the Northwestern Region. The following operations represent the various control units:

1. Clearwater Operation
2. St. Joe Operation
3. Coeur d'Alene Operation
4. Kaniksu Operation
5. Montana Operation (Kootenai and Cabinet Forests)
6. Mount Spokane Operation (No work since 1941)

German war internees, Mexican Nationals and boys of high school age constituted the Forest Service eradication crews. The teen-age workers comprised the bulk of these crews and were recruited from all parts of the United States. The Bureau of Entomology and Plant Quarantine used principally high school boys. Fifty-one percent were recruited from Idaho, twenty percent from the Spokane area, twenty percent from the Midwest and nine percent from parts of the West other than Idaho and the Spokane area. Experience gained during the past two seasons by the supervisory personnel was used to good advantage. The boys were more intelligently handled and better trained, thus better results were obtained and less labor turnover resulted.

German internees were used on ribes eradication work on the Kaniksu operation with good results. An extension of the use of this type of labor to other operations would be a distinct advantage. Mexican National laborers were tried on three operations but worked out satisfactorily only on the St. Joe Forest. It is felt that by making proper advance preparations, creating a better understanding of this type of labor and by instituting an adequate indoctrination and training program for both Mexicans and the supervisory personnel satisfactory work can be accomplished.

Supervisory and other technical positions were difficult to fill. In the case of two operations it was necessary to train high school instructors without previous woods experience and place them in charge of camps. It was necessary to train some of the more outstanding high school boys for checkers and work them under the close supervision of the checker foreman. Individuals capable of acting as assistants or straw bosses were very hard to find. Cooks were scarce and several of those secured were unsatisfactory. Due to these difficulties it was necessary to operate large camps which tend to be inefficient and difficult to manage. In the smaller camps the foremen can give the individual attention so needed in the younger age groups.

Fire was a major factor in interfering with this year's eradication program. All operations lost from one to four weeks. Two operations were unable to

resume effective work after August 1. Generally the camps are just reaching the peak of productive capacity at this time; consequently loss of time in August is most severe.

Practically all work was second and third eradication and was applied to plantations, areas of reproduction and cutover, representing young stands of great potential value. The normal abundance of ribes on these lands, the vast acreages involved, the delays in eradication schedules, the wide-spread presence of the rust, and the susceptibility of young trees to damage are factors which combine to create a highly critical condition in these young age classes. It is obvious that a high degree of efficiency is needed to effect control on such lands. In spite of handicaps, a higher degree of efficiency was attained this year. There was an increased acreage worked; 36,624 acres were covered this year as against 35,934 acres last year. There was a slight decrease in the effective per man-day output; this can be attributed to interference from fire.

A high percent of the lands to which ribes eradication measures were applied received a current check thus contributing to the increased efficiency of the work. Most of the operations were able to carry on some pine disease survey work as an aid in gauging the status of the rust in certain areas. There is great need for an expansion of the pine disease and post check surveys.

The control program continues far behind the necessary rework schedule. The accumulation of thousands of acres in urgent need of rework and the increasing logged over acreage create a complex problem in determining the priority of areas to be worked under the limited war time program. The classification work carried on during the past two seasons has contributed materially in determining the status of the control areas. Factors considered in classifying areas were their status relative to feasibility of control and their pine-producing capacity. Areas of mature timber which had been worked and have subsequently been logged are now classified as unworked cutover type. Areas not considered as warranting additional expenditures are dropped from the control area even though eradication measures had been applied.

In order to present a more complete picture of actual progress, gross acres and net acres are used in the report tables. Gross acres are the total acres worked in each type including those logged or dropped from the control area. Net acres are the actual amounts of worked and unworked acreages still remaining in each type in the control area. Net acreages are now presented by amounts of each type worked or unworked in the control area.

TABLE 1

EXPENDITURES BY APPROPRIATIONS IN INLAND EMPIRE, 1944

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 47,750.88
	Regular BLR-3-4	79,477.33
	Subtotal	\$127,228.21
State of Idaho Timber Protective Associations	State BLR-3-4	12,506.60
	Private BLR-3-4	15,612.98
	Subtotal	\$ 28,119.58
Forest Service	Regular BLR-4	\$475,887.01
Total		\$631,234.80

TABLE 2

CLASSIFIED EXPENDITURES IN INLAND EMPIRE, 1944

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$31,347.82	\$ -	\$ -	\$ 31,347.82	\$ 21,990.44	\$ 53,338.26
Sal. temp. men	4,732.91	15,168.98	374.53	20,276.42	37,952.30	58,228.72
Wages, temp. labs.	5,307.02	59,040.69	16,047.87	80,395.58	292,589.38	372,984.96
Subs. sup.	1,116.32	5,088.12	11,628.30	17,832.74	86,540.97	104,373.71
Equipment	360.04	-	-	360.04	21,865.31	22,225.35
Travel & Trans.	2,603.41	70.32	-	2,673.73	6,365.69	9,039.42
Other sup.	2,283.36	109.22	68.88	2,461.46	8,582.92	11,044.38
Total	\$47,750.88	\$79,477.33	\$28,119.58	\$155,347.79	\$475,887.01	\$631,234.80

TABLE 3

SUMMARY OF RIBES ERADICATION, 1944
INLAND EMPIRE

Working	Eradication Type	Year of Origin	Acres Worked	Man-Days	Ribes Destroyed	Per Acre Man-Days	Ribes
First	Cutover	1940-44	1,111	1,294	259,055	1.16	233
	Burn	1940-44	210	184	47,333	.88	225
	Plantation	1940-44	355	195	42,426	.53	116
	Cutover	1920-39	2,113	2,951	301,423	1.40	143
	Reproduction	1910-39	1,501	3,204	203,480	2.13	156
	Pole		3,798	1,683	86,203	.44	23
	Mature		942	909	120,166	.96	128
	Miscellaneous		282	5	95	.02	1
	Stream (1)		236	1,232	150,551	5.22	638
	Total		10,558	11,657	1,210,737	1.10	115
Second	Plantation	1940-44	60	194	15,587	3.23	260
	Cutover	1920-39	786	1,349	53,164	1.72	68
	Reproduction	1910-39	5,475	8,924	293,564	1.38	45
	Pole		2,448	2,261	88,174	.92	36
	Mature		572	474	22,122	.83	39
	Miscellaneous		33	34	1,503	1.03	46
	Stream		2,493	4,258	277,902	1.71	111
	Total		12,867	17,494	752,016	1.36	58
Third	Plantation	1940-44	236	548	25,036	2.32	106
	Cutover	1920-39	4,213	5,131	317,119	1.22	75
	Reproduction	1910-39	7,314	11,097	160,931	1.52	22
	Pole		214	89	2,425	.42	11
	Mature		260	328	54,790	1.26	211
	Stream (3)		962	2,416	80,289	2.51	83
	Total		13,199	19,609	640,850	1.49	49
All Workings	Cutover	1940-44	1,111	1,294	259,055	1.16	233
	Burn	1940-44	210	184	47,333	.88	225
	Plantation	1940-44	661	937	83,109	1.42	126
	Cutover	1920-39	7,112	3,431	671,706	1.33	94
	Reproduction	1910-39	15,230	23,225	657,975	1.52	43
	Pole		6,460	4,033	176,907	.62	27
	Mature		1,774	1,711	197,078	.96	111
	Miscellaneous		315	39	1,598	.12	5
	Stream (4)		3,691	7,906	508,742	2.14	139
	Total		36,624	48,760	2,603,405	1.33	71

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	11	24	294
(3)	211	442	8,251
(4)	222	466	8,545

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1944
INLAND EMPIRE

State	Working	Class	Acres	Effective Man-Days	Ribes	Gallons Spray	Per Acre Basis Man-Days	Ribes
Idaho	First	EQ-Coop.	1,531	3,440	417,441		2.25	273
		FS-Reg.	3,586	3,781	263,841	294	1.05	74
		Total	5,117	7,221	681,282	294	1.41	133
	Second	EQ-Coop.	3,504	4,088	123,951		1.17	35
		FS-Reg.	5,725	7,759	320,541		1.36	56
		Total	9,229	11,847	444,492		1.29	48
	Third	EQ-Coop.	4,370	4,963	320,328	6,600	1.14	73
		FS-Reg.	5,726	11,727	191,700	1,651	2.05	33
		Total	10,096	16,690	512,028	8,251	1.55	51
	All Workings	EQ-Coop.	9,405	12,491	861,720	6,600	1.33	92
		FS-Reg.	15,037	23,267	776,082	1,945	1.55	52
		Total	24,442	35,758	1,637,802	8,545	1.46	67
Washington	First	FS-Reg.	757	849	178,714		1.12	236
	Second	FS-Reg.	2,553	2,834	202,624		1.11	79
	Third	FS-Reg.	2,887	2,506	107,024		.97	37
	All Workings	FS-Reg.	6,197	6,189	488,362		1.00	79
							.77	75
Montana	First	FS-Reg.	4,684	3,587	350,741			
	Second	FS-Reg.	1,085	2,813	104,900		2.59	97
	Third	FS-Reg.	216	413	21,598		1.91	100
	All Workings	FS-Reg.	5,985	6,813	477,239		1.14	80
							2.25	273
Total	First	EQ-Coop.	1,531	3,440	417,441			
		FS-Reg.	9,027	8,217	793,296	294	.91	88
		Total	10,558	11,657	1,210,737	294	1.10	115
	Second	EQ-Coop.	3,504	4,088	123,951		1.17	35
		FS-Reg.	9,363	13,406	628,065		1.43	67
		Total	12,867	17,494	752,016		1.36	58
	Third	EQ-Coop.	4,370	4,963	320,328	6,600	1.14	73
		FS-Reg.	8,829	14,646	320,322	1,651	1.66	36
		Total	13,199	19,609	640,650	8,251	1.49	49
	All Workings	EQ-Coop.	9,405	12,491	861,720	6,600	1.33	92
		FS-Reg.	27,219	35,269	1,741,683	1,945	1.33	64
		Total	36,624	48,760	2,603,403	8,545	1.33	71

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1944
INLAND EMPIRE

State	Working	Number of Acres Worked											
		By Forest Service				By Bureau of Entomology and Plant Quarantine				Total			
		National Forest	State	Private	Total	National Forest	State	Private	Total	Federal Forest	State	Private	Total
Idaho	First	2,954		632	3,586	50	1,008	473	1,531	3,004	1,008	1,105	2,113
	Second	5,069	168	488	5,725	444	2,594	466	3,504	5,513	2,762	954	3,716
	Third	5,630		96	5,726	80	2,342	1,948	4,370	5,710	2,342	2,044	4,386
	Total	13,653	168	1,216	15,037	574	5,944	2,887	9,405	14,227	6,112	4,103	10,215
Washington	First	757			757					757			757
	Second	2,399		154	2,553					2,399		154	2,553
	Third	2,887			2,887					2,887			2,887
	Total	6,043		154	6,197					6,043		154	6,197
Montana	First	3,011		1,673	4,684					3,011		1,673	4,684
	Second	733		352	1,085					733		352	1,085
	Third	39		177	216					39		177	216
	Total	3,783		2,202	5,985					3,783		2,202	5,985
Total	First	6,722		2,305	9,027	50	1,008	473	1,531	6,772	1,008	2,778	3,786
	Second	8,201	168	994	9,363	444	2,594	466	3,504	8,645	2,762	1,460	4,222
	Third	8,556		273	8,829	80	2,342	1,948	4,370	8,636	2,342	2,221	4,563
	Total	23,479	168	3,572	27,219	574	5,944	2,887	9,405	24,053	6,112	6,459	12,571

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1944
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes by Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inermis	Ribes irriguum	Ribes colaredense	
First	Cutover (1940-44)	1,111	37,902	219,537	1,616				259,055
	Burn (1940-44)	210	18,015	29,318					47,333
	Plantation (1940-44)	365	1,725	40,701					42,426
	Cutover (1920-39)	2,113	36,900	261,475		2,951	97		301,423
	Reproduction (1910-39)	1,501	121,311	69,807		12,299		63	203,480
	Pole	3,798	73,653	9,702		2,551		302	86,208
	Mature	942	118,347	1,819					120,166
	Miscellaneous	282	95						95
	Stream	236	125,175	1,614	882	21,680		1,200	150,551
	All Types	10,558	533,123	633,973	2,498	39,481	97	1,565	1,210,737
Second	Plantation (1940-44)	60	6,747	8,840					15,587
	Cutover (1920-39)	786	32,393	20,671		100			53,164
	Reproduction (1910-39)	6,475	207,508	72,755	9,599	3,702			293,564
	Pole	2,448	34,339	52,886	949				88,174
	Mature	572	15,879	6,036		207			22,122
	Miscellaneous	33	877	626					1,503
	Stream	2,493	164,235	23,581		90,086			277,902
	All Types	12,867	461,978	185,395	10,548	94,095			752,016
Third	Plantation (1940-44)	236	21,819	3,277					25,096
	Cutover (1920-39)	4,213	139,619	177,423	72				317,119
	Reproduction (1910-39)	7,314	103,224	54,721	2,165	804	17		160,931
	Pole	214	1,759	6		660			2,425
	Mature	260	8,874	45,916					54,790
	Stream	962	26,602	320	27,137	26,222	8		80,289
	All types	13,199	301,897	281,668	29,374	27,686	25		640,650
	Cutover (1940-44)	1,111	37,902	219,537	1,616				259,055
All Workings	Burn (1940-44)	210	18,015	29,318					47,333
	Plantation (1940-44)	661	30,291	52,818					83,109
	Cutover (1920-39)	7,112	208,912	459,574	72	3,051	97		671,706
	Reproduction (1910-39)	15,290	432,043	197,283	11,764	16,805	17	63	657,975
	Pole	6,460	109,751	62,594	949	3,211		302	176,807
	Mature	1,774	143,100	53,771		207			197,078
	Miscellaneous	315	972	626					1,598
	Stream	3,691	316,012	25,515	28,019	137,988	8	1,200	508,742
	All Types	36,624	1,296,998	1,101,036	42,420	161,262	122	1,565	2,603,403

TABLE 7

SUMMARY OF RIBES ERADICATION, 1923-1944
INLAND EMPIRE

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes Destroyed	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Cutover	1940-44	4,192	4,785	1,155,357	1.14	276	4,192	108,468
	Burn	1940-44	926	535	100,985	.58	109	926	246
	Plantation	1940-44	5,687	7,972	2,149,010	1.40	378	5,687	432
	Cutover	1920-39	78,634	76,187	24,564,142	.97	312	65,819	248,647
	Reproduction	1910-39	598,592	666,272	181,125,507	1.11	303	588,847	166,847
	Pole		360,373	152,786	27,879,986	.42	77	357,121	92,894
	Mature		707,431	298,323	63,236,654	.42	89	569,118	200,885
	Miscellaneous		36,236	30,911	7,849,273	.85	217	33,967	10,616
	Stream (1)		123,581	309,217	64,264,093	2.50	520	122,601	24,542
	Total		1,915,652	1,546,988	372,325,007	.81	194	1,748,278	853,577
Second	Plantation	1940-44	1,168	1,608	171,547	1.38	147	1,168	-
	Cutover	1920-39	51,838	57,128	12,641,106	1.10	244	51,838	-
	Reproduction	1910-39	169,267	203,326	21,023,579	1.20	124	167,626	-
	Pole		79,632	47,098	4,359,668	.59	55	79,632	-
	Mature		41,927	26,257	2,931,629	.63	70	38,217	-
	Miscellaneous		3,995	4,972	875,793	1.24	219	3,995	-
	Stream (2)		54,860	85,569	11,917,730	1.56	217	54,469	-
	Total		402,687	425,958	53,921,052	1.06	134	395,945	-
Third	Plantation	1940-44	513	919	51,175	1.79	100	513	-
	Cutover	1920-39	14,907	18,334	1,387,566	1.23	93	14,907	-
	Reproduction	1910-39	34,265	47,125	2,671,240	1.38	78	33,658	-
	Pole		7,326	4,803	360,926	.66	49	7,326	-
	Mature		2,175	1,850	210,596	.85	97	2,175	-
	Miscellaneous		560	339	27,446	.61	49	560	-
	Stream (3)		14,655	21,840	2,317,933	1.49	158	14,655	-
	Total		74,401	95,210	7,026,882	1.28	94	73,794	-
All Workings	Cutover	1940-44	4,192	4,785	1,155,357	1.14	276	4,192	108,468
	Burn	1940-44	926	535	100,985	.58	109	926	246
	Plantation	1940-44	7,368	10,499	2,371,732	1.42	322	7,368	432
	Cutover	1920-39	145,379	151,649	38,592,814	1.04	252	132,564	248,647
	Reproduction	1910-39	802,124	916,723	204,820,326	1.14	255	790,121	166,847
	Pole		447,331	204,687	22,600,580	.46	73	444,079	92,894
	Mature		751,533	326,430	66,378,879	.43	88	609,510	200,885
	Miscellaneous		40,791	36,222	8,752,512	.89	215	38,522	10,616
	Stream (4)		193,096	416,626	78,499,756	2.16	407	191,725	24,542
	Total		2,392,740	2,068,156	433,272,941	.86	181	2,219,017	853,577

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	23,135	54,819	1,522,015
(2)	9,298	13,252	242,794
(3)	1,785	1,934	38,375
(4)	34,218	70,005	1,803,184

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1944
INLAND EMPIRE

State	Class	Gross Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis Man-Days Ribes
Idaho	EQ-Reg.	48,984	20,468	5,042,300	79,864	.42 103
	EQ-Coop.	199,871	106,994	20,734,804	195,707	.54 104
	EQ-Emerg.	514,942	404,100	96,874,569	213,935	.78 188
	FS-Reg.	395,452	414,746	78,310,468	458,368	1.05 198
	FS-Emerg.	337,869	216,240	56,636,775	125,491	.64 168
	CCC	590,414	661,693	123,729,240	657,303	1.12 210
Washington	Total	2,087,532	1,824,241	381,328,156	1,730,668	.87 183
	EQ-Emerg.	64,757	63,140	17,825,782		.98 275
	FS-Reg.	33,671	28,462	7,819,917		.85 232
	FS-Emerg.	36,366	14,386	4,013,260		.40 110
	CCC	22,328	24,705	3,487,233		1.11 156
	Total	157,122	130,693	33,146,192		.83 211
Montana	EQ-Reg.	2,092	3,295	761,710	34,795	1.65 380
	EQ-Emerg.	66,076	30,787	5,775,415	1,330	.47 87
	FS-Reg.	29,821	31,080	3,421,736	8,428	1.04 115
	FS-Emerg.	35,712	35,620	7,367,723	21,638	1.00 206
	CCC	14,475	12,440	1,472,009	5,325	.86 102
	Total	148,086	113,222	18,798,593	72,516	.76 127
Idaho Washington Montana	EQ-Reg.	50,986	23,763	5,804,010	114,659	.47 114
	EQ-Coop.	199,871	106,994	20,734,804	195,707	.54 104
	EQ-Emerg.	645,775	498,027	120,475,766	215,265	.77 187
	FS-Reg.	458,944	474,288	89,552,121	466,796	1.03 195
	FS-Emerg.	409,947	266,246	68,017,758	147,129	.65 166
	CCC	627,217	698,838	128,688,482	663,628	1.11 205
Total	Total	2,392,740	2,068,156	433,272,941	1,803,184	.86 181

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1944
INLAND EMPIRE

State	Working	Net Acres Worked in Control Area						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Idaho	First	847,147	16,362	863,509	233,092	418,155	651,247	1,514,756
	Second	206,517	5,840	212,357	50,585	94,985	145,570	357,927
	Third	30,360	1,039	31,399	10,595	18,686	29,281	60,680
	Total	1,084,024	23,241	1,107,265	294,272	531,826	826,098	1,933,363
Washington	First	80,948	315	81,263	6,832	16,261	23,093	104,356
	Second	17,118	60	17,178	3,935	7,047	10,982	28,160
	Third	4,599		4,599	2,114	2,567	4,681	9,280
	Total	102,665	375	103,040	12,881	25,875	38,756	141,796
Montana	First	110,109	40	110,149	734	18,283	19,017	129,166
	Second	8,677		8,677	1	2,180	2,181	10,858
	Third	2,283		2,283		1,551	1,551	3,834
	Total	121,069	40	121,109	735	22,014	22,749	143,858
Total	First	1,038,204	16,717	1,054,921	240,658	452,699	693,357	1,748,278
	Second	232,312	5,900	238,212	54,521	104,212	158,733	396,945
	Third	37,242	1,039	38,281	12,709	22,804	35,513	73,794
	Total	1,307,758	23,656	1,331,414	307,888	579,715	887,603	2,219,017

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1944
INLAND EMPIRE

State	Ownership Class	Net Acres in Control Area		
		Worked	Unworked	Total
Idaho	National Forest	847,147	256,623	1,103,770
	Public Domain	16,362	12,692	29,054
	Subtotal Federal	863,509	269,315	1,132,824
	State	233,092	115,135	348,227
	Private	418,155	349,913	768,068
	Subtotal Other	651,247	465,048	1,116,295
	Total	1,514,756	734,363	2,249,119
Washington	National Forest	80,948	39,700	120,648
	Public Domain	315		315
	Subtotal Federal	81,263	39,700	120,963
	State	6,832	988	7,820
	Private	16,261	4,339	20,600
	Subtotal Other	23,093	5,327	28,420
	Total	104,356	45,027	149,383
Montana	National Forest	110,109	57,842	167,951
	Public Domain	40		40
	Subtotal Federal	110,149	57,842	167,991
	State	734	173	907
	Private	18,283	16,172	34,455
	Subtotal Other	19,017	16,345	35,362
	Total	129,166	74,187	203,353
Total	National Forest	1,038,204	354,165	1,392,369
	Public Domain	16,717	12,692	29,409
	Subtotal Federal	1,054,921	366,857	1,421,778
	State	240,658	116,296	356,954
	Private	452,699	370,424	823,123
	Subtotal Other	693,357	486,720	1,180,077
	Total	1,748,278	853,577	2,601,855

TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1923-1944
INLAND EMPIRE

Working	Eradication Type	Gross Acres	Ribes by Species								Total Ribes
			Ribes lacustris	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triaste	Ribes acerifolium	
First	Cutover (1940-44)	4,192	137,188	1,004,921	13,248						1,155,357
	Burn (1940-44)	926	55,034	35,951							100,985
	Plantation (1940-44)	5,587	588,281	1,560,121	161		447				2,149,010
	Cutover (1920-39)	78,634	8,045,900	16,300,967	81,190	95,981	40,104				24,564,142
	Reproduction (1910-39)	598,592	50,491,389	123,704,886	205,598	1,213,321	505,650	3,518	1,145		181,125,507
	Pole	360,373	14,237,153	12,950,938	65,233	388,519	233,465	302	462	3,914	27,879,986
	Mature	707,431	42,466,027	19,658,542	224,508	403,562	474,605	7,257	26	2,027	63,236,554
	Miscellaneous	36,236	2,543,663	5,143,144	19,825	113,585	29,056				7,849,272
	Stream	123,581	42,577,230	2,003,959	6,395,849	13,091,891	116,220	33,105	21,255	19,584	64,264,093
	All Types	1,915,652	161,151,865	187,368,429	7,005,712	15,305,859	1,399,547	44,182	22,888	25,525	372,325,007
Second	Plantation (1940-44)	1,168	101,581	69,966							171,547
	Cutover (1920-39)	51,838	3,586,225	8,945,458	57,608	30,441	21,374				12,641,106
	Reproduction (1910-39)	169,267	7,490,505	13,331,349	59,208	115,476	24,450		2,591		21,923,579
	Pole	79,632	2,156,296	2,134,947	25,757	39,928	1,740				4,359,663
	Mature	41,927	1,483,056	1,381,074	15,768	15,305	36,159		267		2,931,629
	Miscellaneous	3,995	255,405	614,066	5,447	875					875,793
	Stream	54,860	6,907,823	806,197	2,412,008	1,603,531	32,190		155,981		11,917,730
	All Types	402,537	21,980,891	27,283,057	2,576,796	1,805,556	115,913		158,839		53,921,052
	Plantation (1940-44)	513	46,607	4,568							51,175
	Cutover (1920-39)	14,907	531,211	834,918	16,293	5,001	143				1,387,566
Third	Reproduction (1910-39)	34,265	1,107,643	1,541,276	10,513	11,363	231		114		2,571,240
	Pole	7,326	180,524	179,425	42	929	6				360,926
	Mature	2,175	122,967	85,893	8		1,728				210,596
	Miscellaneous	560	8,659	18,763		24					27,446
	Stream	14,655	1,141,751	32,016	605,966	520,068	8		18,124		2,317,933
	All Types	74,401	3,139,362	2,696,859	632,922	537,385	2,116		18,238		7,026,882
	Cutover (1940-44)	4,192	137,188	1,004,921	13,248						1,155,357
	Burn (1940-44)	926	55,034	35,951							100,985
	Plantation (1940-44)	7,368	736,469	1,624,655	161		447				2,371,732
	Cutover (1920-39)	145,379	12,163,336	26,081,343	155,091	131,423	61,621				38,592,814
All Workings	Reproduction (1910-39)	802,124	59,089,537	143,577,511	275,419	1,340,160	530,331	3,518	3,850		204,820,326
	Pole	447,331	16,573,973	15,265,310	92,032	429,376	235,211	302	462	3,914	32,500,580
	Mature	751,533	44,072,050	21,125,509	240,384	418,867	512,492	7,257	293	2,027	66,378,879
	Miscellaneous	40,791	2,807,727	5,775,973	25,272	114,484	29,056				8,752,512
	Stream	193,096	50,626,804	2,847,172	9,413,823	15,215,490	148,418	33,105	195,360	19,584	78,499,756
	All Types	2,392,740	186,272,118	217,348,345	10,215,430	17,649,800	1,517,576	44,182	199,965	25,525	433,272,941

BLISTER RUST CONTROL WORK, CLEARWATER OPERATION, 1944

By

H. J. Faulkner, Operation Supervisor

Byron C. Amsbaugh, Forest Officer

INTRODUCTION

The blister rust control program on the Clearwater Operation during the 1944 field season consisted of six camps of 30 to 60 men each. Three of the camps were financed by regular Forest Service appropriations and three by co-operative funds administered by the Bureau of Entomology and Plant Quarantine. The Forest Service camps performed work on the Clearwater National Forest and the Bureau camps on state and private lands on the Clearwater Timber Protective Association which is adjacent to the National Forest.

Early season plans called for approximately the same size program as 1943 but due to a shortage of workers the 1944 program was approximately 25 percent less than 1943 and the smallest since 1929.

As in the past two seasons the crews were made up entirely of boys 17 years old and younger with only a small percent experienced in blister rust control work. Past experience in training and working teen-age boys has resulted in significant improvement in the quality and quantity of work and a reduction in the high rate of turnover which is common to this age class of worker.

ORGANIZATION AND ADMINISTRATION

Previous cooperative working agreements between the various agencies interested in control of white pine blister rust continued to guide the organization and administration of field work. Work on Forest Service lands was set up and administered as a special project under the direction of a project leader with technical assistance furnished by Bureau personnel. Bureau personnel administered and directed all work performed by cooperative camps.

The blister rust control field organization was as follows:

Bureau of Entomology and Plant Quarantine

Harry J. Faulkner, Operation Supervisor
John C. Gonyou, Checker Foreman

U. S. Forest Service

Byron C. Amsbaugh, Forest Officer

<u>Program</u>	<u>Number Camps</u>	<u>Number Workers</u>	<u>Number Checkers</u>
EQ-Cooperative	3	105	1
FS-Regular	3	135	1

Total number employed on blister rust control 242

Field headquarters were established near Pierce, Idaho, at the old Reed's ranch CCC camp, on April 17. This camp has been used as a headquarters for all blister rust control work on the operation for the past 8 seasons. It also serves as an operating and supply base for Bureau camps and the past 3 seasons as a work camp for a 25-man crew. A temporary headquarters was established at the Pierce Ranger Station as an operating base for Forest Service camps. Forest Service camps are supplied from the central Forest Service warehouse at the Pierce Ranger Station.

The first work camp was established on May 15 and all camps were operating by June 10. The first camp was closed on August 20 and all camps were closed by September 1.

LOCATION AND DESCRIPTION OF AREAS

The camps were located as follows:

Forest Service

<u>Drainage</u>	<u>Township</u>	<u>Range</u>	<u>Section</u>	<u>Work Performed in Sections</u>
Beaver Creek	39 N.	5 E.	14	14,15,26,27,33,34
Washington Creek	39 N.	6 E.	36	25,26,35,36
Independence Creek	40 N.	11 E.	29	19,20,28,29
*Sylvan Creek	37 N.	7 E.	27	27,28,33,34

Bureau of Entomology and Plant Quarantine

Cow Creek	37 N.	4 E.	15	15,16,20,21,22
Scofield Creek	39 N.	6 E.	33	29,28,32,33,34
Orofino Creek	36 N.	5 E.	10	13,14

*Beaver Creek camp moved to Sylvan Creek late in season.

The Beaver Creek camp performed second and third workings on plantations established from 1937 to 1940. The Beaver Creek 1937 plantings comprising the bulk of the area, supported a comparatively light population of small size ribes. However, it is a difficult area to work due to the heavy cover of brush and herbaceous vegetation. The Alder Creek plantation of approximately 60 acres was burned and planted in 1940 and the ribes are numerous and a few still germinating. Another working will be necessary in two years.

The Washington Creek camp performed both chemical and hand eradication in an advanced reproduction stand which became established after a 1914 burn and 1922 reburn. This was second ribes eradication in the upland and while ribes were fairly light, working conditions were difficult due to windfall, brush and the density of the reproduction. It will be necessary to recheck the stream in a few years. Some additional work may also be necessary in the upland.

The camp located on Independence Creek in the Moose City Basin area performed initial work in pole and advanced reproduction stands. Ribes were comparatively light and confined mostly to the stream type and stream zone. A small amount of chemical work was necessary on Main Independence Creek.

The Sylvan Creek camp which was the second location for the Beaver Creek camp worked for a short time in area planted in 1939 and 1940. The area received a heavy burn in 1931 and ribes population has stabilized. This was second working and the bulk of the ribes was removed on the first coverage of the area. Two camps will be required to complete the ribes eradication on this plantation next season.

The Bureau camp located on Cow Creek worked in a 10-year old reproduction stand on cutover land. Ribes have continued to germinate on this area over a longer period of time following the logging disturbance than is usual on cutover areas and although this was the third working numerous ribes were present over most of the area. Approximately one half of the area was extremely difficult working due to heavy windfall and dense brush. The remainder of the area supported a light to medium residual stand of pole timber and in this type ribes eradication was comparatively easy. Another working will be required on parts of the area.

The Scofield camp, located on Bush Creek which is a tributary of Scofield Creek, worked in the same area as the Washington Creek Forest Service Camp. Both camps were located in the Scofield burn and working conditions are quite comparable. Ribes petiolare was eradicated from approximately 100 acres of stream type in this camp area requiring 6,300 gallons of chemical.

The Bureau camp located in sec. 10, T. 36 N., R. 5 E., is the blister rust control headquarters camp near Pierce. This camp worked entirely on areas which have been logged since 1940, involving the eradication of large numbers of small ribes. Topography in this vicinity is gentle to rolling and working conditions are favorable due to the absence of a heavy brush cover which has not had time to become established since logging.

METHODS AND EQUIPMENT

Standardized methods were generally used with some variations made necessary by the lack of adequate and dependable supervision and workers with past experience. In the past it has been standard practice to rework all crew strips, where ribes were numerous, with one or two men several days following the first coverage of the strip. This year, due to a lack of sufficiently experienced and dependable boys who could work as individuals with a minimum of supervision, the rework men were placed directly behind the crew where they could be constantly supervised and checked by the straw boss. The latter method is more costly and less effective under most working conditions but expedient with the present labor and supervision.

No changes were made in standard equipment this year.

STATUS OF CONTROL

In general the status of control work on the Clearwater National Forest is favorable. Valuable reproduction and pole stands such as those on French, Tamarack, Lolo, Eldorado and Tumble Creek drainages became established prior to the large scale emergency programs of 1933 to 1936 and received initial and reworking during this period. The large block of advance pole in French, and Tamarack Creek drainages, approximately 12,000 acres, has very little infection as a result of the early eradication of Ribes petiolare from the stream type and working of the upland area. However, some additional work will be necessary in the stream type and on portions of the upland where the canopy has not closed sufficiently to suppress ribes growth. This is also true of the advanced pole stand on Eldorado Creek drainage. Disease surveys and post checks will be necessary in advanced reproduction and pole stands on Lolo, Musselshell, Tumble and Pine creeks, to determine where additional work is needed to place them on a maintenance basis.

The work load resulting from logging of mature stands is small at the present time but will increase considerably in the next few years. The cutover area in the Sourdough tributary of Beaver Creek does not offer much hope at present of again becoming a good white pine area. Only white pine was removed leaving a medium to dense canopy of other species which will prohibit the re-establishment of white pine over most of the area. The more recent logging on the Sheep Mountain Fork of Beaver Creek is an excellent seed tree cutting and will reproduce to white pine. Control work is planned in 1946.

The cutting in the Musselshell Creek drainage varies considerably in character. The recent seed tree and shelterwood cuttings in Johnson and Quartz draws offer good possibilities for reestablishing white pine and control work will be initiated at the proper time. The cutting on Deer Creek and south of the Musselshell Meadows will require hazard reduction and stand improvement before white pine can be established.

No expansion of the present worked area is planned for the Upper North Fork of the Clearwater River and Moose City Basin areas on the Kelly Creek district at the present time. The young stands of pine are generally stringers along streams with no large solid blocks. The rust is general throughout the area and ribes eradication costs are high. The value of these young stands will depend largely on the future management of the adjacent mature stands. The relative priority of this area in the blister rust control program is very indefinite because of the present inaccessibility of the area, the age and composition of the mature stands and the high costs for blister rust control.

An isolated block of 4,378 acres of reproduction near the Kelly Creek Ranger Station was dropped from the control area this year. The high cost of working and the heavy pine infection already present make it impracticable to attempt control on this area.

The status of control on state and private lands of the Clearwater Timber

Protective Association presents a different and much less favorable picture than on the National Forest. Cutting of the best white pine areas in state and private ownership has increased since the outbreak of the war and facilities for control work have steadily declined since the end of the large scale emergency programs. The present program is scarcely adequate for maintaining control on cutover lands worked during the larger programs. As a result many recently cutover areas which are coming back to white pine remain unworked and the rust is rapidly building up. However, an excellent seed source is being left on many of these areas which will allow the delay of working for several years. If facilities are available for working these areas within the next few years it may be possible to establish white pine reproduction although the presence of heavy infection will make the job more difficult and costly.

In general reproduction stands that are 10 years old and over are in good condition, although one or more workings will be required in most cases before protection is established. Due to minor disturbances caused by rodents, grazing and windthrow, a few ribes continue to germinate on most cutover areas for a period of 15 to 20 years following logging, although a high percent of stored seed germinates during the first 5 years. With the rust generally present in all young stands this creates a potentially dangerous situation which requires continuous checking to prevent serious damage.

A block of 17,622 acres of cutover area on Winter and Lower Orofino Creek drainages was dropped from the control area this year. This area lies along the western edge of the control area approaching the limits of the white pine type and the original stand was composed of a high percent of species other than pine. The removal of the white pine and cedar generally failed to open the canopy sufficiently for the reestablishment of white pine. No white pine seed source was left and a further opening of the stand would result in the establishment of fir and other species.

CHECKING AND PINE DISEASE SURVEY

One checker foreman and two checkers were used for checking worked areas. The two boys selected as checkers were very adept at finding ribes but lacked sufficient experience and training to organize and plan their work and interpret the significance of the data collected. However, the three worked very satisfactorily as a team with the foreman handling all planning, mapping and interpreting of data.

All worked areas were checked with the exception of 725 acres of advance pole in the Moose City Basin area.

The Upper Beaver Creek plantation area was given a careful check as it was planned to reduce the ribes population to a maintenance basis if possible. The results of the check showed that an average of 8 bushes and 13 feet of live stem still remained on the area including a few new seedlings. Portions of the area will require another working before permanent protection is established,

The small plantation on Alder Creek was reduced to 12 bushes and 16 feet of live stem per acre.

The average checking results for the Bureau and Forest Service camps which worked in the reproduction stand in the Scofield burn area were very similar. The check showed that 11 bushes and 27 feet of live stem were left on the upland area. It had been hoped that the ribes population on this area could be reduced to a considerably lower figure. However, due to the fact that the remaining ribes are scattered individual R. lacustre bushes, heavily screened by other brush and reproduction, another complete working may not be necessary. The stream type on the area will require a mop-up in a few years.

On first working of cutover 1940-44 the checking results showed that the objective of reducing the live stem by removal of the larger bushes had been accomplished. The average checks showed 23 bushes and 21 feet of live stem remaining per acre. The average for cutover 1920 to 1939 was 10 bushes and 17 feet of live stem per acre.

In addition to the regular check a post check was run on approximately 1,000 acres of recently cutover area.

A systematic disease survey was run on a 600 acre cutover area near Hollywood. The area was logged in 1934 with first working in 1939. Part of the area was given a second working in 1940 and 1941.

Results are as follows:

Miles of strip	3½
Number trees examined	1101
Number trees infected	154
Percent of infection	14
Percent infection since last eradication	3

A post check run at the same time showed 12 bushes and 18 feet of live stem per acre. It is planned to rework part of the area during 1945.

PROGRESS TABLES

The following tables, numbers 3 to 6 inclusive, present a summary of the work accomplished this year and tables 7 to 11 inclusive show the accumulative summary of all work since the beginning of control work on the operation in 1929. Several changes were made this year in reporting progress of ribes eradication in order to show more adequately the work status on the white pine control areas. A distinction has been made between gross acres, which represents the acreage worked in each type and net acres, which represents the acreage in each type which still remains in the control area.

Corrections were made for those areas reported in the past which were worked as mature prior to logging and subsequent workings in cutover type reported

as second and third workings. Corrections in gross acres worked in this category were as follows:

Cut over 1920-39 second working to first working	6,959 acres
Cut over 1920-39 third working to first working	865 acres
Cut over 1920-39 third working to second working	2,190 acres
Cut over 1940-44 second working to first working	1,416 acres

In the case of the acreage worked in mature stands which have been subsequently logged, the net worked acreage remaining in the mature type is reduced accordingly; when unworked mature stands are logged the net unworked acreage is likewise reduced. These areas become a cutover type and are shown in the net acreage column according to their work status in this type classification. Adjustments made for these areas in the net acres remaining in the control area were as follows:

Mature (first working) reduced	29,249 acres
Mature (second working) reduced	1,900 acres
Mature (unworked) reduced	8,090 acres
Cutover (unworked) increased	37,339 acres

In the re-examination of the white pine control areas, a total of 22,000 acres were classed as not sustaining satisfactory white pine possibilities to warrant the cost of protection and were dropped from the control area. These areas were as follows:

Cutover (unworked)	5,440 acres
Reproduction (unworked)	4,378 acres
Cutover (partially worked)	12,182 acres

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1944
CLEARWATER OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 15,100.85
	Regular BLR-3-4	26,003.64
	Subtotal	\$ 41,104.49
State of Idaho Clearwater Timber Protective Association	State BLR-3-4	4,622.67
	Private BLR-3-4	6,394.50
	Subtotal	\$ 11,017.17
Forest Service	Regular BLR-4	\$ 61,316.38
Total		\$113,438.04

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1944
CLEARWATER OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	Total
Sal. perm. men	\$ 8,515.52			\$ 8,515.52	\$ 5,356.89	\$ 13,872.41
Sal. temp. men	2,203.85	\$ 4,666.89	\$ 374.53	7,245.25	7,944.09	15,189.34
Wages, temp. labs.	2,498.55	18,410.48	8,017.00	28,926.03	28,631.48	57,557.51
Subs. supplies	674.57	2,835.94	2,619.69	6,130.20	13,172.89	19,303.09
Equipment	114.75			114.75	5,329.23	5,443.98
Travel & transp.	695.02	2.58		697.60	605.43	1,303.03
Other supplies	398.61	87.75	5.95	492.31	276.37	768.68
Total	\$15,100.85	\$26,003.64	\$11,017.17	\$52,121.66	\$61,316.38	\$113,438.04

TABLE 3

SUMMARY OF RIBES ERADICATION, 1944
CLEARWATER OPERATION

Working	Eradication Type	Year of Origin	Acres Worked	Man-Days	Ribes Destroyed	Per Acre	
						Man-Days	Ribes
First	Cutover	1940-44	505	913	225,184	1.81	446
	Cutover	1920-39	140	515	28,681	3.68	205
	Pole		714	999	42,757	1.40	60
	Stream (1)		11	24	882	2.18	80
	Total		1,370	2,451	297,504	1.79	217
Second	Plantation	1940-44	60	194	15,587	3.23	260
	Reproduction	1910-39	802	1,972	105,323	2.46	131
	Total		862	2,166	120,910	2.51	140
Third	Cutover	1920-39	2,017	1,979	115,544	.98	57
	Reproduction	1910-39	1,086	1,207	29,747	1.11	27
	Stream (3)		168	396	23,028	2.36	137
	Total		3,271	3,582	168,319	1.10	51
All Workings	Cutover	1940-44	505	913	225,184	1.81	446
	Plantation	1940-44	60	194	15,587	3.23	260
	Cutover	1920-39	2,157	2,494	144,225	1.16	67
	Reproduction	1910-39	1,888	3,179	135,070	1.68	72
	Pole		714	999	42,757	1.40	60
	Stream (4)		179	420	23,910	2.35	134
	Total		5,503	8,199	586,733	1.49	107

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	11	24	294
(3)	168	396	7,676
(4)	179	420	7,970

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1944
CLEARWATER OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis	
						Man-Days	Ribes
First	EQ-Coop.	576	1,034	243,560		1.80	423
	FS-Reg.	794	1,417	53,944	294	1.78	68
	Total	1,370	2,451	297,504	294	1.79	217
Second	EQ-Coop.	620	1,306	61,826		2.11	100
	FS-Reg.	242	860	59,084		3.55	244
	Total	862	2,166	120,910		2.51	140
Third	EQ-Coop.	2,118	2,276	134,444	6,300	1.07	63
	FS-Reg.	1,153	1,306	33,875	1,376	1.13	29
	Total	3,271	3,582	168,319	7,676	1.10	51
All Workings	EQ-Coop.	3,314	4,616	439,830	6,300	1.39	133
	FS-Reg.	2,189	3,583	146,903	1,670	1.64	67
	Total	5,503	8,199	586,733	7,970	1.49	107

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1944
CLEARWATER OPERATION

State	Working	Number of Acres Worked											
		By Forest Service			By Bureau of Entomology and Plant Quarantine				Total				
		National Forest	Private	Total	National Forest	State	Private	Total	National Forest	State	Private	Total	Total
Idaho	First	784	10	794		103	473	576	784	103	483	586	1,370
	Second	60	182	242	154		466	620	214		648	648	862
	Third	1,153		1,153		240	1,878	2,118	1,153	240	1,878	2,118	3,271
	Total	1,997	192	2,189	154	343	2,817	3,314	2,151	343	3,009	3,352	5,503

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1944
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	
First	Cutover (1940-44)	505	19,829	203,739	1,616	225,184
	Cutover (1920-39)	140	6,438	22,243		28,681
	Pole	714	42,756	1		42,757
	Stream	11			882	882
	All Types	1,370	69,023	225,983	2,498	297,504
Second	Plantation (1940-44)	60	6,747	8,840		15,587
	Reproduction (1910-39)	802	93,496	2,240	9,587	105,323
	All Types	862	100,243	11,080	9,587	120,910
Third	Cutover (1920-39)	2,017	12,199	103,273	72	115,544
	Reproduction (1910-39)	1,086	18,138	11,609		29,747
	Stream	168			23,028	23,028
	All Types	3,271	30,337	114,882	23,100	168,319
All Workings	Cutover (1940-44)	505	19,829	203,739	1,616	225,184
	Plantation (1940-44)	60	6,747	8,840		15,587
	Cutover (1920-39)	2,157	18,637	125,516	72	144,225
	Reproduction (1910-39)	1,888	111,634	13,849	9,587	135,070
	Pole	714	42,756	1		42,757
	Stream	179			23,910	23,910
	All Types	5,503	199,603	351,945	35,185	586,733

TABLE 7

SUMMARY OF RIBES ERADICATION, 1929-1944
CLEARWATER OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes Destroyed	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Cutover	1940-44	2,473	3,724	1,059,112	1.51	428	2,473	24,657
	Plantation	1940-44	60	232	134,749	3.87	2,246	60	0
	Cutover	1920-39	35,690	36,152	13,748,622	1.01	385	23,449	32,970
	Reproduction	1910-39	71,329	108,331	33,428,751	1.52	469	71,329	4,248
	Pole		29,925	17,137	3,828,386	.57	128	29,925	6,331
	Mature		219,289	99,880	23,422,354	.46	107	181,949	40,910
	Miscellaneous		5,852	3,900	1,700,804	.67	291	5,852	7,819
	Stream (1)		42,353	78,124	14,058,124	1.84	332	42,353	13,675
	Total		406,971	347,480	91,380,902	.85	225	357,390	130,610
Second	Plantation	1940-44	60	194	15,587	3.23	260	60	-
	Cutover	1920-39	29,220	28,441	7,844,529	.97	268	29,220	-
	Reproduction	1910-39	22,289	33,030	3,343,304	1.48	150	22,289	-
	Pole		13,995	7,892	1,110,792	.56	79	13,995	-
	Mature		16,067	7,801	811,832	.49	51	14,167	-
	Miscellaneous		511	573	371,107	1.12	726	511	-
	Stream (2)		23,780	26,966	3,329,143	1.13	140	23,780	-
	Total		105,922	104,897	16,826,294	.99	159	104,022	-
Third	Cutover	1920-39	9,837	10,968	867,167	1.11	88	9,837	-
	Reproduction	1910-39	3,410	4,205	276,770	1.23	81	3,410	-
	Stream (3)		2,588	2,755	296,174	1.06	114	2,588	-
	Total		15,835	17,928	1,440,111	1.13	91	15,835	-
All Workings	Cutover	1940-44	2,473	3,724	1,059,112	1.51	428	2,473	24,657
	Plantation	1940-44	120	426	150,336	3.55	1,253	120	0
	Cutover	1920-39	74,747	75,561	22,460,318	1.01	300	62,506	32,970
	Reproduction	1910-39	97,028	145,566	37,048,825	1.50	382	97,028	4,248
	Pole		43,920	25,029	4,939,178	.57	112	43,920	6,331
	Mature		235,356	107,681	24,234,186	.46	103	196,116	40,910
	Miscellaneous		6,363	4,473	2,071,911	.70	326	6,363	7,819
	Stream (4)		68,721	107,845	17,683,441	1.57	257	68,721	13,675
	Total		528,728	470,305	109,647,307	.89	207	477,247	130,610

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	15,027	31,179	794,484
(2)	5,875	8,142	119,985
(3)	705	942	15,012
(4)	21,607	40,263	929,481

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1944
CLEARWATER OPERATION

Class	Gross Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis	
					Man-Days	Ribes
EQ-Reg.	4,412	5,273	1,129,228	79,864	1.20	256
EQ-Coop.	40,826	34,022	5,508,754	136,122	.83	135
EQ-Emerg.	133,970	125,277	30,398,093	136,847	.94	227
FS-Reg.	106,130	94,493	25,474,567	144,036	.89	240
FS-Emerg.	55,908	45,382	14,895,022	24,015	.81	266
CCC	187,482	165,868	32,241,643	408,597	.88	172
Total	528,728	470,305	109,647,307	929,481	.89	207

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1944
CLEARWATER OPERATION

Working	Net Acres Worked in Control Area						
	Federal			Other			Total
	National Forest	Public Domain	Total	State	Private	Total	
First	150,270	3,680	153,950	63,728	139,712	203,440	357,390
Second	49,274	628	49,902	13,762	40,358	54,120	104,022
Third	4,933	12	4,945	1,185	9,705	10,890	15,835
Total	204,477	4,320	208,797	78,675	189,775	268,450	477,247

TABLE 10

PROGRESS OF FIRST WORKING
BY OWNERSHIP CLASSES, 1929-1944
CLEARWATER OPERATION

Ownership Class	Net Acres in Control Area		
	Worked	Unworked	Total
National Forest	150,270	50,082	200,352
Public Domain	3,680	350	4,030
Subtotal Federal	153,950	50,432	204,382
State	63,728	26,530	90,258
Private	139,712	53,648	193,360
Subtotal Other	203,440	80,178	283,618
Total	357,390	130,610	488,000

TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1929-1944
CLEARWATER OPERATION

Working	Eradication Type	Gross Acres	Ribes By Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	
First	Cutover (1940-44)	2,473	81,210	964,654	13,248				1,059,112
	Plantation (1940-44)	60	32,168	102,581					134,749
	Cutover (1920-39)	35,690	2,317,710	11,318,472	72,860	28,370	11,210		13,748,622
	Reproduction (1910-39)	71,329	7,928,610	25,245,707	75,977	47,326	131,131		33,428,751
	Pole	29,925	2,510,390	1,278,821	31,617	6	7,090	462	3,828,386
	Mature	219,289	16,261,450	6,795,503	197,832	107,922	59,621	26	23,422,354
	Miscellaneous	5,852	338,812	1,329,756	17,838	114	14,284		1,700,804
	Stream	42,353	10,239,770	324,583	2,766,543	701,834	25,394		14,058,124
Second	All Types	406,971	39,710,120	47,360,077	3,175,915	885,572	248,730	498	91,380,902
	Plantation (1940-44)	60	6,747	8,840					15,587
	Cutover (1920-39)	29,220	1,039,469	6,737,035	55,843	106	12,076		7,844,529
	Reproduction (1910-39)	22,289	846,853	2,474,813	21,598	4	36		3,343,304
	Pole	13,995	545,661	548,785	16,095	1	250		1,110,792
	Mature	16,067	395,208	400,473	15,768	116		267	811,832
	Miscellaneous	511	19,861	345,799	5,447				371,107
	Stream	23,780	1,893,616	516,470	826,524	76,716	9,141	6,676	3,329,143
Third	All Types	105,922	4,747,415	11,032,215	941,275	76,943	21,503	6,943	16,826,294
	Cutover (1920-39)	9,837	150,633	700,098	16,293		143		867,167
	Reproduction (1910-39)	3,410	144,658	130,164	1,934		14		276,770
	Stream	2,588	188,778	2,573	82,007	22,916			296,174
All Workings	All Types	15,835	484,069	832,835	100,234	22,816	157		1,440,111
	Cutover (1940-44)	2,473	81,210	964,654	13,248				1,059,112
	Plantation (1940-44)	120	39,915	111,421					150,336
	Cutover (1920-39)	74,747	3,507,812	18,755,605	144,996	28,476	23,429		22,460,318
	Reproduction (1910-39)	97,028	8,920,121	27,850,684	99,509	47,330	131,181		37,048,825
	Pole	43,920	3,056,051	1,827,606	47,712	7	7,340	462	4,939,178
	Mature	235,356	16,656,658	7,195,976	213,600	108,038	59,621	293	24,234,186
	Miscellaneous	6,363	358,673	1,675,555	23,285	114	14,284		2,071,911
All Workings	Stream	68,721	12,322,164	843,626	3,675,074	801,366	34,535	6,676	17,683,441
	All Types	528,728	44,941,604	59,225,127	4,217,424	985,331	270,390	7,431	109,647,307

BLISTER RUST CONTROL WORK, ST. JOE OPERATION, 1944

By

F. J. Heinrich, Operation Supervisor
D. J. Moore, Pathologist, U. S. Forest Service
W. F. Painter, Assistant Operation Supervisor
F. A. Moore, Unit Supervisor, U. S. Forest Service

INTRODUCTION

White pine blister rust control program for the 1944 field season was carried on with two Bureau Cooperative and five Forest Service regular camps. A total acreage of 6,098 acres was covered by these seven camps. This program was far inadequate to meet the needs of work to be done.

Young white pine stands needing rework were given the highest priority in the season's work policy. In two cases small areas supporting excellent young pine adjacent to areas previously worked were given initial protection. Until an adequate control program is available the rust will continue to intensify on many areas. With intensification, control costs increase as more workings are required and a higher standard of efficiency is necessary.

ORGANIZATION AND ADMINISTRATION

Blister rust control on the St. Joe operation was organized as in the past in accordance with agreements between federal, state and private agencies and in accordance with provisions of the Appropriation Act. Personnel of the Bureau of Entomology and Plant Quarantine provided assistance in the over-all planning, coordination and technical direction of the program on lands of all ownership and administered the work of the two camps on state and private lands. The Forest Service administered the work of five camps on National Forest lands.

The blister rust control 1944 field organization was as follows:

Bureau of Entomology and Plant Quarantine

F. J. Heinrich, Operation Supervisor
W. F. Painter, Assistant Operation Supervisor in charge of checking

U. S. Forest Service

D. J. Moore, Forest Officer
F. A. Moore, Unit Supervisor

<u>Program</u>	<u>Number Camps</u>	<u>Number Workers</u>	<u>Number Checkers</u>
EQ-Cooperative	2	130	2
FS-Regular	5	<u>270</u>	3

Total number employed on blister rust control 400

Field headquarters at Clarkia, Idaho maintained by the Bureau was again used as an operating base for Bureau and some Forest Service activities. Warehousing and supplying of subsistence for all classes of camps were handled through the Clarkia Ranger Station warehousing facilities.

Workers for the Bureau camps were recruited through the State Forester's Office, Boise, Idaho, and the Blister Rust Control Office in Spokane, Washington. A sufficient number of employees was secured to fill the allotted number of camps. The Forest Service secured its workers locally, through forestry schools and by recruitment throughout the various regions. In spite of an intensive recruiting campaign it was not possible to hire enough men to fill camp quotas.

Boys 16 years of age accounted for 85 percent of the workers and 90 percent were inexperienced. A better understanding of the methods of handling the youthful worker resulted in fewer personnel problems this year. The work accomplishments were comparable to those of last year but below the normal standards. The greatest handicap was the length of time the workers were available. Thirty-six percent left the job in four weeks or less because of other employment, dissatisfaction with the work or homesickness. The remainder were on the job from one to slightly over two months. The short school vacations were a contributing factor to the abbreviated field season. Some schools did not let out until the middle of June while others reconvened shortly after August 15.

Thirty-seven Mexican Nationals were secured through the War Food Administration for blister rust control work in the Forest Service camps. These men averaged about 30 years of age and adapted themselves well to camp life and woods work. Their accomplishments were greater on areas supporting heavy ribes concentrations than on areas with few ribes. This can be attributed partially to their inexperience and training. Training was difficult since only one of the group understood and spoke the English language with any degree of fluency.

Forest Service crews spent considerable time on fire suppression. On the Sanders fire alone, which started September 6, all crews spent approximately ten days on fire fighting.

Cooperative camps on state and private land

1. Burnt Creek. Established May 16, closed August 19.

Area located in Burnt and Fisher Creek drainages in secs. 13, 23, 24, 25 and 26, T. 39 N., R. 2 E. and secs. 18 and 19, T. 39 N., R. 1 E. A total of 2,348 acres consisting of 501 acres of cutover and 1,847 acres of pole, 41-60 year age class, comprise the work unit. The total cutover acreage consisted of small areas which had been spot logged. Ribes eradication was difficult due to small ribes being intermingled with other vegetation and some additional cleanup work will be necessary within two years.

The area on Burnt Creek supports a thrifty and well-stocked stand of pole-sized white pine. Ribes were light and working conditions not difficult in all the pole stands. Infection is light on this area as a whole and protection in the pole stands has been established. The camp area was completed.

2. Purdue Creek Area. Camp established June 4, closed August 26.

Worked area located in secs. 6, 7, 8, 17 and 20, T. 41 N., R. 1 E. and the N. $\frac{1}{2}$, sec. 13, T. 41 N., R. 1 W. The major portion of the work was in natural reproduction which lay in secs. 8, 17 and 20. Difficult working conditions due to windfalls, dead brush and density of the stand were encountered on 132 acres of first working in sec. 20. The young stand south of Purdue Creek was established in 1900 and the remainder in 1920. A 1938 white pine plantation located in secs. 6 and 7 was worked for the second time. The remaining area worked supported pine originating after 1928 and lay in the N. $\frac{3}{4}$, sec. 13, T. 41 N., R. 1 W. and constituted third working.

The rust is heavy in the N. $\frac{1}{2}$, sec. 20 and this area should be reworked and the adjacent protection zone extended in 1946. The infection on the remainder of the area is not serious and most of the area is protected.

Forest Service camps on federal land

1. Hidden Creek Area. Camp established May 10, closed September 1.

Area located on Hidden and Keeler Creek drainages secs. 21, 27, 28 and 34, T. 42 N., R. 1 E. and secs. 2 and 3, T. 41 N., R. 1 E. The 225 acres of upland worked were all reproduction type established in 1922 and worked for the third time. A total of 205 acres of stream type was worked on Hidden and Keeler Creeks. Due to the light stocking and general blister rust infection part of this area should be reworked in 1946.

Marble Creek Unit

The following areas designated as Cranberry, Toles and Bussel Creeks constitute a portion of the Marble Creek unit. This unit comprises 6,420 acres of thrifty well-stocked white pine reproduction which was established following a fire in 1922. Infection is general throughout the stand and some damage has taken place. However, this is not serious since some of the trees are producing seed and seedlings are being established.

2. Cranberry Creek Area. Camp established June 29, closed August 19.

Area located in sec. 25, T. 44 N., R. 2 E. and secs. 30 and 31, T. 44 N., R. 3 E. The portion worked consisted of 181 acres of reproduction and 15 acres of cutover. This was third working for all the area. Due to the density of the reproduction and the presence of windfalls difficult working conditions were encountered. One half of the area worked has been protected. The remainder will need some additional work in 1945.

3. Bussel Creek Area. Camp established May 18, closed August 31.

Work area lay in secs. 34 and 35, T. 44 N., R. 2 E. and secs. 2 and 3, T. 43 N., R. 2 E. This area is relatively free of brush but bordered by

heavier brush conditions on the higher slopes. There are several large alder patches on the area in T. 43 N., R. 2 E. All of the 683 acres covered was third working with the previous working being done in 1940. Working conditions were not difficult. A satisfactory ribes eradication job was accomplished with over 75 percent of worked area being protected. Infection is present throughout the area but no serious damage has resulted.

4. Toles Creek Area. Camp established May 22, closed August 15.

All work areas were located in secs. 23, 25 and 26, T. 44 N., R. 2 E. The upland work consisted of 361 acres third working and 75 acres second working. Scattered Ribes petiolare within the stream type were sprayed with chemical. Infection is generally distributed throughout the area and some additional work must be done in 1945 before protection is established.

5. Lucky Swede Creek Area. Camp established June 5, closed September 25.

All areas worked lay in sec. 1, T. 46 N., R. 5 E.; secs. 6 and 9, T. 46 N., R. 6 E.; sec. 31, T. 47 N., R. 6 E.; secs. 26, 34 and 35, T. 47 N., R. 5 E. This is part of the North Fork of the St. Joe River unit which is made up of several scattered but thrifty well-stocked plantations established in 1914-15. In most cases the white pine appears only on the north and west exposures. Yellow pine was planted on the dry, south exposure. Working conditions on this unit are difficult due to the presence of windfalls, brush density and in some cases steep rocky slopes.

Although the rust is present throughout the area it has not caused any serious damage. Part of the area worked this year will need some additional cleanup work in 1945 before protection is established.

METHODS AND EQUIPMENT

The same standard approved methods for hand ribes eradication used last year were applied again throughout the season. In most cases three men worked in each lane with a crew leader directly behind; in a few cases two men were used instead of three. Crews were worked in gang formation with a straw boss in direct charge of three to four crews. This method provided the necessary close supervision.

Chemical ribes eradication was on a small scale again this year being confined to mop-up work and the spraying of a few isolated patches.

A training school was held for blister rust supervisory personnel on May 22 and 23. These men were given complete schooling in all phases of the work. Straw bosses and crew men were given thorough training on the job.

During the month of June all Forest Service supervisory personnel and crew men were given intensive training in the use of tools and fire suppression methods and organization. A two-day school was held at each camp.

CHECKING

The regular and post check on worked areas which were temporarily discontinued in 1943 were activated during the 1944 season. Four teen-age boys from the 1943 eradication crews with above average ability to detect ribes were selected as trainees for checking assignments. The return of a former checker foreman from military service greatly facilitated in the training and supervision of the boys.

The use of teen-age boys as checkers necessitated modifications in the checking procedure to maintain production and efficiency. Such modifications in no way affected the ultimate objective of the checking work.

First, the boys lacked the ability to efficiently plan or organize their work. Second, they disliked working alone in the woods. Third, all had a natural reluctance to accept responsibility. Fourth, a 16-foot strip in brush and reproduction was too much ground for a teen-age lad to cover adequately.

Two boys were assigned to work together. One man ran compass; the other paced. The boys worked abreast and each worked an 8-foot strip. The interval between workers varied from $\frac{1}{2}$ to 1 chain depending upon the type of ground cover. The boy who paced used the compass man as a guide. He recorded the ribes found on his strip and those found by the compass man.

The two boys working together overcame the fear of being alone in the woods. Each had a certain responsibility to the other for procedure along the strip. The system tended to encourage a competitive attitude in the search for ribes which increased their efficiency. Having each man doing something tended to get away from the customary horse play. By having checkers working in adjacent areas the problem of supervision was greatly simplified.

It is realized that two men working together, each working an 8-foot strip, would not run twice as many strips as a man working alone. However, the increased efficiency plus more frequent samples of areas having a low ribes population more than compensated for any loss of area covered.

A total of 6,098 acres was checked during the season. In addition, 6,200 acres of the 1943 work areas were checked. Areas which were classified as post check within the 1944 work areas were inspected by the checkers prior to any work by the crews.

CONTROL STATUS

At the close of the 1944 field season the actual acreage covered on ribes eradication since 1923 was 538,459 acres. Of this total 368,179 were given one working, 145,110 acres worked twice and 25,170 acres worked for the third time. There remain 399,791 acres in the unworked classification.

In order to have the tables in this report show a clearer picture of accomplishments to date and future work remaining, a change in procedure has been adopted which shows a distinction between "gross acres" and "net acres". Gross acres refers to total acres worked prior to logging, burning or acres dropped from the control area. Net acres represents the acreage in each type which still remains in the control area and shows it under its current classification. This year 53,325 acres worked as mature type and now logged were reclassified as unworked cutover. A total of 89,475 acres of unworked mature which were previously carried in deferred status has been placed in the unworked classification.

During the past two years considerable work has been done on analyzing and classifying all areas within the control boundary. This analysis will be completed in 1945 and the complete results will appear in the 1945 report.

The results of blister rust control work on the St. Joe operation are very encouraging. On some areas the rust has intensified and considerable damage has been done. However, the percent of damage is not great compared to the vast acreage upon which control measures are being successfully applied. The complete success is dependent upon additional work which is urgently needed now.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1944 ST. JOE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 17,357.36
	Regular BLR-3-4	29,670.88
	Subtotal	\$ 47,028.24
State of Idaho	State BLR-3-4	\$ 3,596.10
Potlatch Timber Protective Association	Private BLR-3-4	4,959.06
	Subtotal	\$ 8,555.16
Forest Service	Regular BLR-4	\$116,657.36
Total		\$172,240.76

TABLE 2

CLASSIFIED EXPENDITURES, CALENLAR YEAR 1944
ST. JOE OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$12,165.24			\$12,165.24	\$ 4,012.32	\$ 16,177.56
Sal. temp. men	1,206.95	\$ 6,896.46		8,103.41	8,057.04	16,160.45
Wages, temp. labs.	1,621.19	22,664.42	\$2,398.28	26,683.89	71,128.89	97,812.78
Subs. supplies	266.85	100.00	6,138.67	6,505.52	24,822.83	31,328.35
Equipment	112.99			112.99	6,274.49	6,387.48
Travel & transp.	665.11	4.45		669.56	1,546.88	2,216.44
Other supplies	1,319.03	5.55	18.21	1,342.79	814.91	2,157.70
Total	\$17,357.36	\$29,670.88	\$8,555.16	\$55,583.40	\$116,657.36	\$172,240.76

TABLE 3

SUMMARY OF RIBES ERADICATION, 1944
ST. JOE OPERATION

Working	Eradication Type	Year of Origin	Acres Worked	Man-Days	Ribes Destroyed	Per Acre	
						Man-Days	Ribes
First	Cutover	1920-39	501	1,012	69,853	2.02	139
	Reproduction	1910-39	210	789	22,656	3.76	109
	Total		711	1,801	92,509	2.53	130
Second	Reproduction	1910-39	948	2,043	36,393	2.16	38
	Pole		1,847	1,190	27,578	.64	15
	Total		2,795	3,233	63,971	1.16	23
Third	Cutover	1920-39	15	34	282	2.27	19
	Reproduction	1910-39	2,349	5,780	58,773	2.46	25
	Stream (3)		228	519	9,899	2.28	43
	Total		2,592	6,333	68,954	2.44	27
All Workings	Cutover	1920-39	516	1,046	70,135	2.03	136
	Reproduction	1910-39	3,507	8,612	117,822	2.46	34
	Pole		1,847	1,190	27,578	.64	15
	Stream (4)		228	519	9,899	2.29	43
	Total		6,098	11,367	225,434	1.86	37

Chemical work included above:

	Acres		Gallons	
	Man-Days		Spray	
(3)	43	46	575	
(4)	43	46	575	

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1944
ST. JOE OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis	
						Man-Days	Ribes
First	EQ-Coop.	633	1,448	80,327		2.29	127
	FS-Reg.	78	353	12,182		4.53	156
	Total	711	1,801	92,509		2.53	130
Second	EQ-Coop.	2,620	2,600	55,760		.99	21
	FS-Reg.	175	633	8,211		3.62	47
	Total	2,795	3,233	63,971		1.16	23
Third	EQ-Coop.	270	208	2,049	300	.77	8
	FS-Reg.	2,322	6,125	66,905	275	2.64	29
	Total	2,592	6,333	68,954	575	2.44	27
All Workings	EQ-Coop.	3,523	4,256	133,136	300	1.21	39
	FS-Reg.	2,575	7,111	87,298	275	2.76	34
	Total	6,098	11,367	225,434	575	1.86	37

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1944
ST. JOE OPERATION

State	Working	Number of Acres Worked										
		By Forest Service			By Bureau of Entomology and Plant Quarantine				Total			
		Nat'l. For.	Private	Total	Nat'l. For.	State	Private	Total	Nat'l. For.	Other		
										State	Private	Total
Idaho	First	78		78	50	583		633	128	583		583
	Second	165	10	175	290	2,330		2,620	455	2,330	10	2,340
	Third	2,322		2,322	80	120	70	270	2,402	120	70	190
	Total	2,565	10	2,575	420	3,033	70	3,523	2,985	3,033	80	3,113

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1944
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	
First	Cutover (1920-39)	501	2,542	67,311		69,853
	Reproduction (1910-39)	210	1,797	20,859		22,656
	All Types	711	4,339	88,170		92,509
Second	Reproduction (1910-39)	948	19,741	16,640	12	36,393
	Pole	1,847	13,057	13,572	949	27,578
	All Types	2,795	32,798	30,212	961	63,971
Third	Cutover (1920-39)	15	282			282
	Reproduction (1910-39)	2,349	46,341	10,267	2,165	58,773
	Stream	228	5,790		4,109	9,899
All Workings	All Types	2,592	52,413	10,267	6,274	68,954
	Cutover (1920-39)	516	2,824	67,311		70,135
	Reproduction (1910-39)	3,507	67,879	47,766	2,177	117,822
	Pole	1,847	13,057	13,572	949	27,578
	Stream	228	5,790		4,109	9,899
	All Types	6,098	89,550	128,649	7,235	225,434

TABLE 7

SUMMARY OF RIBES ERADICATION, 1929-1944
ST. JOE OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes Destroyed	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Cutover	1940-44	265	189	14,002	.71	53	265	31,344
	Plantation	1940-44	2,209	4,763	1,092,843	2.16	495	2,209	0
	Cutover	1920-39	16,291	11,381	3,596,739	.70	221	16,291	156,962
	Reproduction	1910-39	217,573	239,939	80,753,499	1.10	371	217,573	105,121
	Pole		86,838	33,082	7,780,055	.38	90	86,838	18,516
	Mature		177,162	68,756	17,998,538	.39	102	123,837	87,848
	Miscellaneous		2,652	2,297	767,429	.87	289	2,652	-
	Stream (1)		35,469	97,121	23,358,708	2.74	659	35,469	-
	Total		538,459	457,528	135,361,813	.85	251	485,134	399,791
Second	Plantation	1940-44	745	638	53,382	.86	72	745	
	Cutover	1920-39	7,046	7,502	524,246	1.06	74	7,046	
	Reproduction	1910-39	78,437	93,478	9,075,436	1.19	116	78,437	
	Pole		36,848	21,735	1,318,108	.59	36	36,848	
	Mature		8,965	6,831	821,719	.76	92	8,055	
	Miscellaneous		431	43	2,567	.10	6	431	
	Stream (2)		12,638	27,514	5,191,492	2.18	411	12,638	
Third	Total		145,110	157,741	16,986,950	1.09	117	144,200	
	Cutover	1920-39	60	75	777	1.25	13	60	
	Reproduction	1910-39	13,559	23,442	685,330	1.73	51	13,559	
	Pole		4,287	2,602	69,994	.61	16	4,287	
	Mature		170	325	38,042	1.91	224	170	
	Stream (3)		7,094	12,537	1,677,259	1.77	236	7,094	
All Workings	Total		25,170	38,981	2,471,402	1.55	98	25,170	
	Cutover	1940-44	265	189	14,002	.71	53	265	31,344
	Plantation	1940-44	2,954	5,401	1,146,225	1.83	388	2,954	0
	Cutover	1920-39	23,397	18,958	4,121,762	.81	176	23,397	156,962
	Reproduction	1910-39	309,569	356,859	90,514,265	1.15	292	309,569	105,121
	Pole		127,973	57,419	9,168,157	.45	72	127,973	18,516
	Mature		186,297	75,912	18,858,299	.41	101	132,062	87,848
	Miscellaneous		3,083	2,340	769,996	.76	250	3,083	-
	Stream (4)		55,201	137,172	30,227,459	2.48	548	55,201	-
	Total		708,739	654,250	154,820,165	.92	218	654,504	399,791

Chemical work included above:

Acres Man-Days Gallons
 Spray

(1) 7,404 21,683 669,706
(2) 3,245 4,731 111,663
(3) 1,068 844 19,818
(4) 11,717 27,258 801,187

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1944
ST. JOE OPERATION

Class	Gross Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis	
					Man-Days	Ribes
EQ-Coop.	33,600	27,806	4,598,241	59,585	.83	137
EQ-Emerg.	234,519	157,898	43,593,387	77,088	.67	186
FS-Reg.	177,397	198,063	34,415,128	314,332	1.12	194
FS-Emerg.	70,981	45,138	15,333,106	101,476	.64	216
CCC	192,242	225,345	56,890,303	248,706	1.17	296
Total	708,739	654,250	154,820,165	801,187	.92	218

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1944
ST. JOE OPERATION

Working	Net Acres Worked in Control Area						
	Federal			Other			Total
	National Forest	Public Domain	Total	State	Private	Total	
First	215,376	12,458	227,834	57,898	199,402	257,300	485,134
Second	76,916	5,159	82,075	19,213	42,912	62,125	144,200
Third	14,803	1,027	15,830	1,651	7,689	9,340	25,170
Total	307,095	18,644	325,739	78,762	250,003	328,765	654,504

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1944
ST. JOE OPERATION

Ownership Class	Net Acres in Control Area		
	Worked	Unworked	Total
National Forest	215,376	96,832	312,208
Public Domain	12,458	12,007	24,465
Subtotal Federal	227,834	108,839	336,673
State	57,898	57,171	115,069
Private	199,402	233,781	433,183
Subtotal Other	257,300	290,952	548,252
Total	485,134	399,791	884,925

TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1929-1944
ST. JOE OPERATION

Working	Eradication Type	Gross Acres	Ribes by Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	
First	Cutover (1940-44)	265	10,308	3,694					14,002
	Plantation (1940-44)	2,209	158,749	933,486	161		447		1,092,843
	Cutover (1920-39)	16,291	1,132,425	2,452,653	8,329	2,120	1,212		3,596,739
	Reproduction (1910-39)	217,573	15,368,276	64,763,516	122,680	344,709	154,318		80,753,499
	Pole	86,838	3,234,919	4,393,484	21,170	63,499	76,983		7,790,055
	Mature	177,162	9,757,096	7,918,594	26,516	40,599	255,733		17,998,538
	Miscellaneous	2,652	148,445	615,565	1,987	1,432			767,429
	Stream	35,469	16,372,384	888,029	3,331,826	2,749,642	16,695	132	23,358,708
	All Types	538,459	46,182,602	81,959,021	3,512,669	3,202,001	505,388	132	135,361,813
	Plantation (1940-44)	745	8,165	45,217					53,382
Second	Cutover (1920-39)	7,046	285,707	227,775	1,765	2,781	6,218		524,246
	Reproduction (1910-39)	78,437	3,443,481	5,531,928	32,750	62,364	4,913		9,075,436
	Pole	36,848	572,299	721,515	5,807	18,483	4		1,318,108
	Mature	8,965	353,412	436,466		19	31,822		821,719
	Miscellaneous	431	456	2,111					2,567
	Stream	12,638	3,045,535	163,110	1,081,834	753,469	6,073	141,471	5,191,492
	All Types	145,110	7,709,055	7,128,122	1,122,156	837,116	49,030	141,471	16,986,950
	Cutover (1920-39)	60	666	111					777
	Reproduction (1910-39)	13,559	306,316	363,344	8,586	7,084			685,330
	Pole	4,287	49,625	20,183	42	144			69,994
Third	Mature	170	32,990	3,316	8		1,728		38,042
	Stream	7,094	793,270	23,044	488,054	370,509		2,382	1,677,259
	All Types	25,170	1,182,867	409,998	496,690	377,737	1,728	2,382	2,471,402
	Cutover (1940-44)	265	10,308	3,694					14,002
	Plantation (1940-44)	2,954	166,914	978,703	161		447		1,146,225
	Cutover (1920-39)	23,397	1,418,798	2,680,539	10,094	4,901	7,430		4,121,762
	Reproduction (1910-39)	309,569	19,118,073	70,658,788	164,016	414,157	159,231		90,514,265
	Pole	127,973	3,856,843	5,125,182	27,019	82,126	76,987		9,168,157
	Mature	186,297	10,143,498	8,358,376	26,524	40,618	289,293		18,858,299
	Miscellaneous	3,083	148,901	617,676	1,987	1,432			769,996
All Workings	Stream	55,201	20,211,189	1,074,183	4,901,714	3,873,620	22,768	143,985	30,227,459
	All Types	708,739	55,074,524	89,497,141	5,131,515	4,416,854	556,146	143,985	154,820,165

BLISTER RUST CONTROL WORK, COEUR D'ALENE OPERATION, 1944

By

M. C. Riley, Operation Supervisor

C. J. Pederson, Forester, U. S. Forest Service

INTRODUCTION

The blister rust control program on the Coeur d'Alene National Forest during the 1944 season was conducted by four crews financed from regular Forest Service appropriations. A total of 3,549 acres were worked, consisting of 662 acres of first working, 1,352 acres of second and 1,535 of third working.

There was a larger nucleus of experienced workers than in 1943 and more experienced camp foremen were available. The season was characterized by an abnormal amount of fire fighting. This activity, plus a combination of early season wet weather, a late start and the early return of workers to their homes, permitted only about five weeks of effective ribes eradication work.

The first camp was established on May 1 and was occupied by eradication crews on May 27. The last camp was established on June 20. The first camp closed on August 19 and all were closed by September 1.

In order to present a better analysis of actual progress in accomplishing control, a distribution has been made between gross acres and net acres. Gross acres refers to the total area worked in each type including those which have been dropped from the control area or have been logged since working, and net acres refers to the actual acreage of each type remaining in the control area. These changes make it possible to show worked or unworked area by types within the control area.

The Forest Service was responsible for the administration and maintenance of the camps and technical supervision was provided by the Bureau of Entomology and Plant Quarantine.

The total number of workers was 221.

LOCATION AND DESCRIPTION OF AREAS

Ribes eradication efforts were confined to plantations, hemlock-removal areas and stands of natural reproduction. The Nowhere crew performed second and third working on plantations on New Deal, President, Davy and Senator Creeks. This portion of the worked area lies in secs. 12, 13 and 14, T. 52 N., R. 2 E. and secs. 7, 8, 17 and 18, T. 52 N., R. 3 E. This is all 1935 plantation except New Deal Creek which was planted in 1936. The Independence crew performed second working in all of the 1935 plantation below the mouth of Owl Creek and first working in 1931 plantations on the lower end of Yellowpine and Trident Creeks and some natural reproduction near the mouth of Minor Creek. This area is located in secs. 28, 29, 31, 32 and 33, T. 53 N., R. 2 E. and secs. 4, 5, 6, 8 and 9, T. 52 N., R. 2 E. The Hudlow crew worked for the

second time the hemlock-removal area on lower Solitaire Creek where planting was done in 1942, third working on Honey Burn, planted in 1941 by direct spot seeding and on the Middle Fork of Hudlow Creek in both plantation and natural reproduction areas. This crew worked in secs. 5, 6, 16, 17 and 30, T. 52 N., R. 1 W., secs. 24 and 25, T. 52 N., R. 2 W., secs. 31 and 32, T. 53 N., R. 1 W. and sec. 36, T. 53 N., R. 2 W. The Bottom Creek crew performed third working in natural reproduction following logging on Burnt Cabin Creek opposite the mouth of Bottom Creek in sec. 13, T. 51 N., R. 2 W. and sec. 18, T. 51 N., R. 1 W.

The plantation areas worked by the Nowhere and Independence crews represented comparatively easy working conditions. Stream type on lower Independence Creek, where original work had been done by the bulldozer method, contained fewer ribes than are usually found on this type of area, while stream type along the Coeur d'Alene River near the mouth of Senator Creek represented extremely difficult working conditions. The hemlock-removal area on Solitaire and the Honey Burn contained many dwarf bushes and the presence of a heavy growth of fireweed made ribes eradication difficult. Natural reproduction areas generally involved rather severe working conditions because of wind-falls and brush.

All areas worked are in Federal ownership.

WORKING METHODS

More experienced workers were available this season than in the previous year and the higher caliber of workers made possible the use of more assistant camp foremen and straw bosses. However, it was necessary to carry on a continual training program. In general, the method of a crew leader working behind each crew with a group of crews working in adjacent lanes was used. In some cases in the plantation areas where visibility was very good it was possible to use individual three-man crews with the crew leader working in line. This method was used whenever possible. String lines were laid in advance and less difficulty was experienced in this phase of the work than formerly. The improved ribes tool was used by all crew members and the Sheely hook was used by crew leaders and straw bosses. All workers were given training in the proper use of common woods tools before any ribes eradication work was undertaken. The practice initiated last season of the camp foreman interviewing each worker upon his arrival in camp was continued. The benefits derived are very worthwhile.

Visual training through the medium of motion pictures proved to be an effective aid in conducting a successful safety program.

CHECKING AND SURVEYS

Only one experienced checker was available at the start of the season but three others, two of whom had previous ribes eradication experience, were trained early in the season. Before eradication workers arrive, all available

camp foremen and assistants were used for post check work on the Nowhere area. Post and advance checks were run on the Independence area prior to working. During the season post check was also conducted on reproduction areas on and adjacent to Bennett and Cardinal Creeks, Deception Creek, and Brett Creek.

Regular check was performed on practically all of the area worked this season. The only exceptions were in areas where the number of ribes removed was such that it was evident that additional working would be necessary, such as heavy stream type along the Coeur d'Alene River on the Nowhere area. Generally speaking, regular check shows that very satisfactory work was performed, especially on plantation areas. On the hemlock-removal areas there still remain patches of area which need further work, due principally to dwarf bushes occurring where visibility is very poor. Some of the natural reproduction stands will need further work but on the majority of these areas the work was satisfactory. A portion of the stream type which was worked for the second time shows a rather high check but this is in areas where there is very little infection.

Only a small amount of disease survey was conducted during the season due to the fact that all checkers were needed for regular check and only one man was available for the work after the ribes eradication season. Disease survey strips were run at Sands Creek on the Deception Creek Experimental Forest, Bear Creek and on the Flat Creek sanitation area which was planted in 1941. The results of this survey are summarized as follows:

<u>Area</u>	<u>Miles</u>	<u>Trees</u>	<u>Trees</u>	<u>Percent</u>
	<u>Strip</u>	<u>Examined</u>	<u>Infected</u>	<u>Infection</u>
Sands Creek, sec. 32, T. 51 N., R. 1 W.	4.7	3,913	124	3.17
Bear Creek, secs. 5, 6, 7, 8, T. 51 N., R. 3 E.	3.6	1,006	68	6.76
Flat Creek, secs. 11, 12, 13, T. 52 N., R. 1 E.	7.1	3,921	38	.97

On Sands Creek the amount and distribution of infection and the age of the cankers indicate that work should be done here immediately to prevent a rapid build-up of the disease. Figures for Bear Creek, which is an unworked natural reproduction area, show the majority of infection to be within 10 chains of the stream. On the Flat Creek hemlock-removal area the bulk of infection is near the adjacent mature stand. These areas should be worked in 1945.

Approximately two months were spent by three of the permanent personnel after the end of the ribes eradication season continuing the area classification work started in the fall of 1943. In general, the area classified includes the remainder of the North Fork of the Coeur d'Alene River including Canyon and Laverne Creeks, Teepee drainage and portions in and around Shoshone Creek (formerly Big Creek) including Falls, Bridge, Loading and Uranus Creeks. This classification work revealed some excellent white pine areas which had not been worked and also brought out more clearly the point noticed last

season, that on the North Fork area very few cutover areas will reproduce to white pine without some form of stand improvement or sanitation. Further examples of this occur on Sob, Barney, Little, Bootjack and Leiberg Creeks and along the river face adjacent to these areas. Apparently this is also true of sizable areas on Shoshone Creek. A higher percentage of area examined this year goes into the deferred classification than was true last season because such high priority areas as plantations and good natural reproduction stands were examined during 1943.

The classification work this fall revealed a large number of areas where post check work is needed and served to emphasize again to what great extent this phase of the program is behind schedule.

Practically all of the area south of Township 51 North remains to be classified.

CONTROL STATUS

Until classification work is completed, any control status figures applying to the entire operation are subject to continual change since the post check program is so much behind schedule. The work performed during the 1944 field season resulted in approximately 2,183 acres of that work being classed as on a maintenance basis, 623 acres needing post check and 713 acres needing rework.

Post check surveys on areas not worked during the current season resulted in 1,675 acres classed as being on a maintenance basis and 650 acres needing rework.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1944
COEUR D'ALENE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 3,239.74
Forest Service	Regular BLR-4	85,656.69
Total		\$88,896.43

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1944
COEUR D'ALENE OPERATION

Item	Bureau of Entomology and Plant Quarantine	Forest Service	Total
	Regular BLR-1-4	Regular BLR-4	
Sal. perm. men	\$5,121.20	\$ 4,482.85	\$ 7,604.05
Sal. temp. men		6,044.78	6,044.78
Wages, temp. labs.		57,928.82	57,928.82
Subs. supplies		12,791.48	12,791.48
Equipment		3,497.97	3,497.97
Travel and transp.	113.54	614.02	732.56
Other supplies		296.77	296.77
Total	\$3,239.74	\$85,656.69	\$88,896.43

TABLE 3

SUMMARY OF RIBES ERADICATION, 1944
COEUR D'ALENE OPERATION

Working	Eradication Type	Year of Origin	Acres Worked	Man-Days	Ribes Destroyed	Per Acre	
						Man-Days	Ribes
First	Reproduction	1910-39	662	525	27,207	.79	41
Second	Reproduction	1910-39	1,123	1,249	27,018	1.11	24
	Pole		35	59	2,939	1.69	85
	Mature		20	121	8,390	6.05	420
	Stream		174	462	17,194	2.66	99
	Total		1,352	1,891	55,591	1.40	41
Third	Plantation	1940-44	236	548	25,096	2.32	106
	Cutover	1920-39	417	1,001	25,051	2.40	60
	Reproduction	1910-39	665	1,162	7,109	1.75	11
	Mature		61	129	4,592	2.11	75
	Stream		156	709	20,021	4.54	128
	Total		1,535	3,549	81,869	2.31	53
All Workings	Plantation	1940-44	236	548	25,096	2.32	106
	Cutover	1920-39	417	1,001	25,051	2.40	60
	Reproduction	1910-39	2,450	2,936	61,334	1.20	25
	Pole		35	59	2,989	1.69	85
	Mature		81	250	12,982	3.09	160
	Stream		330	1,171	37,215	3.55	113
	Total		3,549	5,965	164,667	1.68	46

TABLE 4

TOTAL RIBES BY SPECIES ERADICATED, 1944
COEUR D'ALENE OPERATION

Working	Eradication Type	Year of Origin	Acres	Ribes by Species				Total Ribes
				Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	
First	Reproduction	1910-39	662	15,091		12,116		27,207
Second	Reproduction	1910-39	1,123	21,507	5,511			27,018
	Pole		35	2,989				2,989
	Mature		20	7,308	1,082			8,390
	Stream		174	6,732		10,462		17,194
	Total		1,352	38,536	6,593	10,462		55,591
Third	Plantation	1940-44	236	21,819	3,277			25,096
	Cutover	1920-39	417	24,897	154			25,051
	Reproduction	1910-39	665	3,914	2,597	581	17	7,109
	Mature		61	4,201	391			4,592
	Stream		156	10,030	89	9,894	8	20,021
	Total		1,535	64,861	6,508	10,475	25	81,869
All Workings	Plantation	1940-44	236	21,819	3,277			25,096
	Cutover	1920-39	417	24,897	154			25,051
	Reproduction	1910-39	2,450	40,512	8,108	12,697	17	61,334
	Pole		35	2,989				2,989
	Mature		81	11,509	1,473			12,982
	Stream		330	16,762	89	20,356	8	37,215
	Total		3,549	118,438	13,101	33,053	25	164,667

TABLE 5

SUMMARY OF RIBES ERADICATION, 1927-1944
COEUR D'ALENE OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes Destroyed	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Cutover	1940-44							7,648
	Burn	1940-44	716	351	53,652	.49	75	716	246
	Plantation	1940-44	787	1,660	431,014	2.11	543	787	432
	Cutover	1920-39	16,231	21,084	5,314,713	1.30	327	16,231	19,378
	Reproduction	1910-39	89,489	138,607	20,678,429	1.55	231	87,666	8,190
	Pole		65,866	31,254	4,479,922	.47	68	65,130	8,765
	Mature		141,096	97,729	13,798,358	.62	98	123,079	9,310
	Miscellaneous		13,312	16,655	2,961,278	1.25	222	12,838	325
	Stream		14,808	57,225	11,770,618	3.86	795	14,700	2,715
	Total		342,305	354,565	59,487,984	1.04	174	321,197	57,009
Second	Plantation	1940-44	363	776	102,578	2.14	283	363	
	Cutover	1920-39	8,786	12,237	1,902,030	1.39	216	8,786	
	Reproduction	1910-39	16,237	26,861	1,741,825	1.65	107	15,554	
	Pole		4,816	3,093	485,788	.64	101	4,816	
	Mature		9,963	7,588	795,798	.76	80	9,663	
	Miscellaneous		1,392	2,760	353,465	2.00	256	1,392	
	Stream		7,615	13,555	1,538,698	1.78	202	7,507	
	Total		49,212	66,870	6,920,182	1.36	141	48,071	
Third	Plantation	1940-44	513	919	51,175	1.79	100	513	
	Cutover	1920-39	2,920	4,892	263,217	1.63	90	2,920	
	Reproduction	1910-39	2,421	4,433	189,057	1.85	78	1,814	
	Pole		482	497	50,612	1.03	105	482	
	Mature		1,544	1,072	66,448	.69	43	1,544	
	Miscellaneous		13	11	1,424	.85	110	13	
	Stream		1,372	2,140	121,162	1.56	88	1,372	
	Total		9,285	14,014	743,095	1.51	80	8,658	
All Workings	Burn	1940-44	716	351	53,652	.49	75	716	
	Plantation	1940-44	1,663	3,355	584,767	2.02	352	1,663	
	Cutover	1920-39	27,937	38,213	7,479,960	1.37	258	27,937	
	Reproduction	1910-39	108,197	169,951	22,809,311	1.57	209	105,034	
	Pole		71,164	34,844	5,016,322	.49	70	70,428	
	Mature		152,603	96,339	14,660,604	.63	96	134,286	
	Miscellaneous		14,707	19,426	3,316,167	1.32	225	14,283	
	Stream		23,795	72,920	13,430,478	3.06	564	23,579	
Total			400,782	435,449	67,151,261	1.09	168	377,926	

TABLE 6

SUMMARY OF RIBES ERADICATION
BY CLASSES OF CAMPS, 1927-1944
COEUR D'ALENE OPERATION

Class	Gross Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
				Man-Days	Ribes
EQ-Reg.	25,776	8,351	2,846,383	.32	110
EQ-Emerg.	41,039	35,541	6,589,217	.87	161
FS-Reg.	73,985	84,658	13,950,029	1.14	189
FS-Emerg.	111,711	86,897	17,620,173	.78	158
CCC	148,271	220,002	26,145,459	1.49	176
Total	400,782	435,449	67,151,261	1.09	168

TABLE 7

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1927-1944
COEUR D'ALENE OPERATION

Working	Net Acres Worked in Control Area				
	Federal		Other		Total
	National Forest	State	Private	Total	
First	305,053	5,427	10,717	16,144	321,197
Second	45,827	440	1,804	2,244	48,071
Third	8,529	45	84	129	8,658
All Workings	395,409	5,912	12,605	18,517	377,926

TABLE 8

PROGRESS OF FIRST WORKING
BY OWNERSHIP CLASSES, 1927-1944
COEUR D'ALENE OPERATION

Ownership Class	Net Acres in Control Area		
	Worked	Unworked	Total
National Forest	305,053	50,058	355,111
State	5,427	711	6,138
Private	10,717	6,240	16,957
Subtotal Other	16,144	6,951	23,095
Total	321,197	57,009	378,206

TABLE 9

TOTAL RIBES BY SPECIES ERADICATED, 1927-1944
COEUR D'ALENE OPERATION

Working	Eradication Type	Gross Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Burn (1940-44)	716	47,019	6,633				53,652
	Plantation (1940-44)	787	324,914	106,100				431,014
	Cutover (1920-39)	16,231	3,806,948	1,462,643	1	17,536	27,585	5,314,713
	Reproduction (1910-39)	89,489	12,164,944	7,882,039	2,227	526,767	102,452	20,678,429
	Pole	65,866	2,612,374	1,799,139	12,246	12,823	43,340	4,479,922
	Mature	141,096	10,712,514	2,845,919	1	89,402	150,522	13,798,358
	Miscellaneous	13,312	1,294,074	1,626,473		31,121	9,610	2,961,278
	Stream	14,808	7,251,355	183,261	31,474	4,236,141	68,387	11,770,618
	All Types	342,305	38,214,142	15,912,207	45,949	4,913,790	401,896	59,497,994
Second	Plantation (1940-44)	363	86,669	15,909				102,578
	Cutover (1920-39)	8,796	1,561,390	323,954		13,606	3,080	1,902,030
	Reproduction (1910-39)	16,237	935,192	784,569		13,229	8,835	1,741,825
	Pole	4,816	364,939	111,666	4,736	3,882	565	495,788
	Mature	9,963	511,401	268,971		11,089	4,337	795,798
	Miscellaneous	1,392	163,878	189,587				353,465
	Stream	7,615	1,068,439	43,758		420,500	6,001	1,538,698
	All Types	49,212	4,691,908	1,738,414	4,736	462,306	22,818	6,920,182
Third	Plantation (1940-44)	513	46,607	4,568				51,175
	Cutover (1920-39)	2,920	225,776	37,441				263,217
	Reproduction (1910-39)	2,421	118,182	69,210		1,648	17	189,057
	Pole	482	40,422	10,190				50,612
	Mature	1,544	64,171	2,277				66,448
	Miscellaneous	13	129	1,295				1,424
	Stream	1,372	83,174	202		37,778	8	121,162
	All Types	9,265	578,461	125,183		39,426	25	743,095
All Workings	Burn (1940-44)	716	47,019	6,633				53,652
	Plantation (1940-44)	1,663	458,190	126,577				584,767
	Cutover (1920-39)	27,937	5,594,114	1,824,038	1	31,142	30,665	7,479,960
	Reproduction (1910-39)	108,197	13,218,318	8,735,818	2,227	541,644	111,304	22,609,311
	Pole	71,164	3,017,735	1,920,995	16,982	16,705	43,905	5,016,322
	Mature	152,603	11,288,086	3,117,167	1	100,491	154,959	14,660,604
	Miscellaneous	14,707	1,458,081	1,817,355		31,121	9,610	3,316,167
	Stream	23,795	8,402,968	227,221	31,474	4,694,419	74,396	13,430,478
	All Types	400,782	43,484,511	17,775,804	50,685	5,415,522	424,739	67,151,261

BLISTER RUST CONTROL WORK, KANIKSU OPERATION, 1944

By

H. A. Brischle, Operation Supervisor

G. M. Houghton, Checker Foreman

The Kaniksu operation is composed of the valuable stands of white pine timber in Bonner and Boundary Counties in northern Idaho and Pend Oreille County in Northeastern Washington. Within these 4,300 square miles of valuable timber are the lands administered by the Kaniksu National Forest, the Priest Lake Timber Protective Association, portions of the Pend Oreille Timber Association, as well as state and private ownership.

Due to the demands of the armed forces and war industries, logging operations are going on at a rapid rate in mature stands through the entire forest. Stands of white pine as well as mixed have rapidly diminished during the past three years of heavy cutting. Much control work will be necessary from now on to protect the young stands of white pine as they become established on these cutover areas. At the present time there are 26,000 acres of cutover in the 1920-1939 group to be post checked and portions worked. There are 39,000 acres of cutover in the 1940-1944 group to be post checked, much of which will require work.

The year 1944 was again characterized by a shortage of labor and supervisory personnel. Labor consisted of boys under 18 years of age and war internees. The boys were mostly local, but a few came from distant parts of the United States. A good number of the boys proved to be too immature for the work, and as a result the turnover was heavy. Many of the boys had never had a full time job of any kind before. Some had never been away from home. Much supervision and training was necessary to get such immature and inexperienced crews trained for work.

The work program consisted of five Forest Service regular camps varying in man power from 30 to 60 men, one internee camp of 85 men, and two internee camps of 35 men each. There were also two Bureau Cooperative camps, one of 60 men and one of 30. These two were financed on a cooperative basis between the federal government, the state of Idaho, and the Priest Lake Timber Protective Association. With the exception of the internee camps most of the camps were operated throughout the season with less than full strength because of turnover and the shortage of replacements.

ORGANIZATION AND ADMINISTRATION

The first camp was established on May 15; others were established through May and all were located by June 20. The internee camps continued eradication work through September. All other camps were closed by September 1. The camps were called on several fires on the forest and to fires on the Coeur d'Alene and St. Joe Forests. A total of 851 man-days were spent on fire suppression by the regular crews and 2,687 man-days were spent on fires by the internees.

There was no personnel available for the position of unit supervisor. This phase of the job was handled by Leonard J. Easley and Harold A. Brischle in the forest and internee camps. Gilbert M. Houghton supervised the checking for the entire operation and in addition acted as unit supervisor for the Bureau Cooperative camps.

Kalispell Bay served as the operation headquarters for both Forest Service and Bureau camps. The clerical work necessary in the ordering of supplies, equipment, preparation of pay rolls, reports, property records, etc., was under the supervision of Harry S. Peters. One internee assisted with the clerical work and warehousing. Deliveries to isolated camps were made by pack stock. Other camps were serviced by truck.

The organization was as follows:

H. A. Brischle, Operation Supervisor
 L. J. Easley, Assistant Operation Supervisor
 G. M. Houghton, Checker Foreman
 Harry S. Peters, Assistant to Operation Supervisor

The above officers supervised and administered both the Bureau of Entomology and Plant Quarantine and Forest Service camps.

<u>Program</u>	<u>Number Camps</u>	<u>Number Workers</u>	<u>Number Checkers</u>
FS-Regular	5	200	2
FS-Internee	3	155	1
EQ-Cooperative	2	100	1

Total number of men employed on blister rust control - 459

An active safety and accident prevention campaign was carried on throughout the summer. Boys were taught the use of tools and all safety precautions necessary on the job. There were only two lost-time accidents on the operation.

DESCRIPTION OF AREAS AND LOCATION OF WORK

Bureau Cooperative Camps

<u>Camp 401</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
Big Creek	57 N.	3 W.	5,6
	57 N.	4 W.	1,2,3
	58 N.	3 W.	31
	58 N.	4 W.	36

This was a troublesome area. Logging operations were carried on from 1929 to 1934 in this drainage. The ribes were small, well screened, and difficult to find. The area had been worked twice before. Much rework and mopping up were

necessary to get the area to acceptable standards.

<u>Camp 402</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
Soldier Creek	60 N.	3 W.	27,28,34

The work in this drainage was done in a stand of white pine reproduction originating after a 1919 burn. It was first work. The ribes were numerous, large, and difficult to pull. The average was 161 bushes per acre requiring an average of 1.93 man-days per acre.

Forest Service Camps (Regular)

<u>Camp 400</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
Kalispell Bay	59 N.	5 W.	10,11,12
	60 N.	5 W.	2,9,11,12
	61 N.	5 W.	27,34
	62 N.	5 W.	25,36
	36 N.	45 E.	1,6,7,12 (Washington)

This camp was located at Blister Rust Headquarters. The crew was hauled to work by truck. The work was done in plantations, reproduction, and cutover areas within a radius of 15 miles from headquarters. This camp was an efficient arrangement as it cut down the expense of maintaining a headquarters, and four different areas were worked without having to set up or move a camp. The Diamond Creek plantation, the Binarch Creek cutover, and the reproduction of Granite Mountain and Kedish Mountain were the upland areas worked. In addition the stream type on Kalispell Creek was worked. Production was good as the crews pulled an average of 83 bushes per acre at the rate of .75 man-days per acre.

<u>Camp 454</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
Upper Tillicum Creek	37 N.	45 E.	4,5 (Washington)

This camp did work in a stand of reproduction originating after the 1926 burn. Most of the work was done in areas which had been covered before. The ground cover made the search and elimination of ribes difficult. Reproduction was thick and the numerous windfalls on the forest floor made both visibility and eradication difficult. The camp personnel was re-grouped on August 1 with other forest camps to make way for a group of Mexicans. The Mexicans were later transferred to a road construction camp. As a result this area was not finished.

<u>Camp 455</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
Lower Tillicum Creek	37 N.	45 E.	2,3,4,10,11 (Washington)

This camp worked in white pine reproduction originating after a 1926 burn. Most of the work was done in areas which had been covered once and twice before. The visibility was poor and the ribes were light and scattered. The area was completely worked.

<u>Camp 453</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
South Fk. Granite Cr.	37 N.	45 E.	16,17,20,21 (Washington)

This camp performed work in an area of white pine reproduction originating after a 1926 burn. Previous eradication work had been done in this area. The ground coverage made it difficult for the crews to work as it was steep, brushy, and covered with windfalls. An acceptable standard was maintained and the camp finished the work outlined for them.

German Internee Camps

<u>Pelke Camp</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
	34 N.	45 E.	1,6 (Washington)
	35 N.	45 E.	36 "
	59 N.	5 W.	7,8,9,14,15,16,17,20,21,22,23 (Idaho)

This camp worked almost entirely in cutover areas which had been logged from 1920 to 1939. Portions of the area were heavily covered with seedling ribs. The major stream type of the Upper West Branch of Priest River was worked.

<u>Boswell Camp</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
	33 N.	45 E.	1,2,11,12,13,15,21,22,23,26,27,28,35 (Wash.)
	33 N.	46 E.	6,7,18,19 (Washington)

The area worked by the internees stationed in this camp was scattered over seventeen sections. It was entirely in stands of pole and cutover areas. The ribs were small and numerous. They averaged 178 to an acre and required 1.5 man-days per acre to eradicate.

<u>Camp F-164</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
	57 N.	5 W.	1,2,7,17,26,27,30,35
	57 N.	6 W.	6
	58 N.	5 W.	19,20,29,30,31,36
	32 N.	46 E.	31 (Washington)

The work performed by the internees stationed in this camp was in the Quartz Creek, the Cuban Hill, and the Pine Creek planted areas. The cutover areas near Moore Creek and the Lower West Branch of Priest River were also worked. Heavy brush and steep terrain were encountered in working the protection zone adjacent to the planted areas.

After the completion of the eradication work one crew of internees worked on pruning and canker elimination on the Cuban Hill plantation. A total of 17,133 trees were pruned. Of these 1,213 were cut down for being infected with trunk or killing cankers.

CHECKING AND PINE DISEASE SURVEY

The checking force was composed of one Bureau and two Forest Service checkers.

Of the 15,489 acres worked 12,355 were checked. All areas that did not meet an acceptable eradication standard according to checking data were reworked.

The personnel problems which confronted the eradication force also applied to the checking personnel. No checkers were used, however, who had not had previous experience in blister rust work. These checkers were of high school age and not as competent as regular checkers used in the past. The boys were picked for this work by their accuracy in finding ribes. Their efficiency in finding ribes on check strips was good. A number of sample strips were run by the checker foreman on the checkers' work and some pine disease information was secured on areas checked during the season. In all cases the data of the checkers were substantiated. The main objective of finding ribes and designating areas needing rework was accomplished. The young checkers, due to the lack of experience, were not able to fully interpret the results of the data gathered. This deficiency was somewhat overcome by working the checkers in groups in order that they might have close supervision of the checker foreman.

PINE DISEASE SURVEY

A party of four men conducted a pine disease survey from the ninth of September through the fifteenth of October. Eight drainages were examined. All examinations were made on reproduction or plantation areas. A direct comparison is made on some of the areas previously surveyed. These comparisons and the results of the survey in general are encouraging. Less than two percent of the trees infected had cankers on 1941 and later wood. The gain in white pine reproduction from 1936 through 1944 has been 52 percent. A gain in reproduction over the spread of the rust has occurred in all drainages excepting the South Fork of Granite Creek where the rust has increased from five percent in 1941 to 22 percent found in 1944. The gain in white pine has been ten percent in this drainage.

The drainages surveyed and the data found are listed below:

UPPER WEST BRANCH AND PAQUA CREEK

Number examined	783
Number infected	268
Percent of infection	34
Percent of loss	27
Pine per acre	783

The majority of the cankers found were on 1940 wood indicating the severity of the 1941 spread of the rust. It is planned to rework this area in the near future. The ribes are few in number but scattered. It will not be hard to control this area from the spread of the rust. This area received its only working in 1938.

UPPER WEST BRANCH SWITCH BACK AREA

Number examined	485
Number infected	100
Percent infected	20
Percent loss	19
Pine per acre	1600

This area has had only one working which was done in 1938. At that time ribes were extremely heavy and difficult to eradicate. Infection was well established as early as 1935.

SOUTH FORK OF GRANITE CREEK

Number examined	1928
Number infected	555
Percent infection	28
Percent loss	11
Pine per acre	714

A direct comparison of this troublesome area is shown below.

1944		1941	
Number examined	1392	Number examined	5233
Number infected	305	Number infected	281
Percent infection	22	Percent infected	5
Pine per acre	730	Pine per acre	654

It is to be noted that the pine is still increasing in this area even though the spread of the rust has increased. A good eradication job was performed on the area this year. The majority of the cankers found were introduced by the heavy wave of 1941 infection.

PINE CREEK PLANTATION

Number examined	200
Number infected	86
Percent infection	43
Percent loss	21
Pine per acre	650

This area was worked in 1944 and pruned after the termination of eradication work. There are now less than 2 ribes and 4 feet of live stem per acre remaining. The removal of cankers from the plantation should materially aid in retarding the spread of the rust in the future.

CUBAN HILL PLANTATION

Number examined	384
Number infected	83
Percent infected	22
Percent loss	11
Pine per acre	750

DIRECT COMPARISON OF CUBAN HILL 1944 AND 1941

1944

1941

Number examined	314
Number infected	55
Percent infected	14
Pine per acre	750

Number examined	1139
Number infected	22
Percent infection	2
Pine per acre	750

This area was planted in 1932. The growth of the trees has been vigorous. The majority of the cankers are on 1941 wood and are limb cankers. The plantation is closing in rapidly and soon a great number of the cankers will be eliminated by natural pruning. This plantation was worked this year.

"CAMP 15 ROAD" (PLANTATION)

Number examined	314
Number infected	17
Percent infected	.8
Percent loss	.8
Pine per acre	870

This area was snagged and burned in 1938. It was planted in the spring of 1941. No ribes were found in the plantation.

INDIAN CREEK

Number examined	373
Number infected	37
Percent infected	10
Percent loss	8

The effects of an early eradication work are clearly shown in this drainage. The reproduction is closing in fast. Another eradication job is planned for the area in the near future.

HUNT CREEK

Number examined	605
Number infected	30
Percent infected	5
Percent loss	4

This area was first worked in 1934. There were 300 ribes eradicated per acre. The area was again worked in 1939. The eradication has stood up well, and the area was greatly benefited by this early ribes eradication.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1944
KANIKSU OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 9,422.18
	Regular BLR-3-4	23,802.81
	Subtotal	\$ 33,224.99
State of Idaho	State BLR-3-4	\$ 4,287.83
Priest Lake Timber Protective Association	Private BLR-3-4	4,259.42
	Subtotal	\$ 8,547.25
Forest Service	Regular BLR-4	\$140,520.80
Total		\$182,293.04

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1944
KANIKSU OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$5,304.38			\$ 5,304.38	\$ 5,276.60	\$ 10,580.98
Sal. temp. men	1,322.13	\$ 3,605.63		4,927.76	15,906.39	20,834.15
Wages, temp. labs.	1,187.28	17,965.79	\$5,632.59	24,785.66	82,377.19	107,162.85
Subs. supplies	174.90	2,152.18	2,869.94	5,197.02	23,846.77	29,043.79
Equipment	132.30			132.30	4,366.62	4,498.92
Trucks						
Travel & transp.	742.71	63.29		806.00	2,605.36	3,411.36
Other Supplies	558.48	15.92	44.72	619.12	6,141.87	6,760.99
Total	\$9,422.18	\$23,802.81	\$8,547.25	\$41,772.24	\$140,520.80	\$182,293.04

TABLE 3

SUMMARY OF RIBES ERADICATION, 1944
KANIKSU OPERATION

Working	Eradication Type	Year of Origin	Acres Worked	Man-Days	Ribes Destroyed	Per Acre	
						Man-Days	Ribes
First	Cutover	1940-44	606	381	33,871	.63	56
	Burn	1940-44	210	184	47,333	.88	225
	Plantation	1940-44	365	195	42,426	.53	116
	Cutover	1920-39	1,428	1,406	202,315	.98	142
	Reproduction	1910-39	348	1,028	107,420	2.95	309
	Mature		170	81	7,727	.48	45
	Stream		4	18	1,684	4.50	421
	Total		3,131	3,293	442,776	1.05	141
Second	Cutover	1920-39	786	1,349	53,164	1.72	68
	Reproduction	1910-39	3,497	3,098	93,086	.89	27
	Pole		241	339	45,315	1.41	188
	Mature		536	341	13,389	.64	25
	Stream		1,713	2,264	201,690	1.32	118
	Total		6,773	7,391	406,644	1.09	60
Third	Cutover	1920-39	1,764	2,117	176,242	1.20	100
	Reproduction	1910-39	3,214	2,948	65,302	.92	20
	Pole		139	39	1,035	.28	7
	Mature*		199	199	50,198	1.00	252
	Stream		269	429	7,133	1.59	27
	Total		5,585	5,732	299,910	1.03	54
All Workings	Cutover	1940-44	606	381	33,871	.63	56
	Burn	1940-44	210	184	47,333	.88	225
	Plantation	1940-44	365	195	42,426	.53	116
	Cutover	1920-39	3,978	4,872	431,721	1.22	109
	Reproduction	1910-39	7,059	7,074	265,808	1.00	38
	Pole		380	378	46,350	.99	122
	Mature		905	621	71,514	.69	79
	Stream		1,986	2,711	210,507	1.37	106
	Total		15,489	16,416	1,149,330	1.06	74

*Roads worked in mature adjacent to reproduction and cutover areas

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1944
KANIKSU OPERATION

State	Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis Man-Days	Ribes
Idaho	First	EQ-Coop.	322	958	93,554	2.98	291
		FS-Reg.	2,052	1,486	170,508	.72	83
		Total	2,374	2,444	264,062	1.03	111
	Second	EQ-Coop.	264	182	6,365	.69	24
		FS-Reg.	3,956	4,375	197,655	1.11	50
		Total	4,220	4,557	204,020	1.08	48
	Third	EQ-Coop.	1,982	2,479	183,835	1.25	93
		FS-Reg.	716	747	9,051	1.04	13
		Total	2,698	3,226	192,886	1.20	71
	All Workings	EQ-Coop.	2,568	3,619	283,754	1.41	110
FS-Reg.		6,724	6,608	377,214	.98	56	
Total		9,292	10,227	660,968	1.10	71	
Washington	First	FS-Reg.	757	849	178,714	1.12	236
	Second	FS-Reg.	2,553	2,834	202,624	1.11	79
	Third	FS-Reg.	2,887	2,506	107,024	.87	37
	All Workings	FS-Reg.	6,197	6,189	488,362	1.00	79
Idaho and Washington	First	EQ-Coop.	322	958	93,554	2.98	291
		FS-Reg.	2,809	2,335	349,222	.83	124
		Total	3,131	3,293	442,776	1.05	141
	Second	EQ-Coop.	264	182	6,365	.69	24
		FS-Reg.	6,509	7,209	400,279	1.11	61
		Total	6,773	7,391	406,644	1.09	60
	Third	EQ-Coop.	1,982	2,479	183,835	1.25	93
		FS-Reg.	3,603	3,253	116,075	.90	32
		Total	5,585	5,732	299,910	1.03	54
	All Workings	EQ-Coop.	2,568	3,619	283,754	1.41	110
		FS-Reg.	12,921	12,797	865,576	.99	67
		Total	15,489	16,416	1,149,330	1.06	74

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1944
KANIKSU OPERATION

State	Working	Number of Acres Worked									
		By Forest Service				By Bureau	Total				
		National Forest	State	Private	Total	State	Federal	Other			Total
							National Forest	State	Private	Total	
Idaho	First	1,430		622	2,052	322	1,430	322	622	944	2,374
	Second	3,492	168	296	3,956	264	3,492	432	296	728	4,220
	Third	620		96	716	1,982	620	1,982	96	2,078	2,698
	Total	5,542	168	1,014	6,724	2,568	5,542	2,736	1,014	3,750	9,292
Washington	First	757			757		757				757
	Second	2,399		154	2,553		2,399		154	154	2,553
	Third	2,887			2,887		2,887				2,887
	Total	6,043		154	6,197		6,043		154	154	6,197
Total	First	2,187		622	2,809	322	2,187	322	622	944	3,131
	Second	5,891	168	450	6,509	264	5,891	432	450	882	6,773
	Third	3,507		96	3,603	1,982	3,507	1,982	96	2,078	5,585
	Total	11,585	168	1,168	12,921	2,568	11,585	2,736	1,168	3,904	15,489

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1944
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Cutover (1940-44)	606	18,073	15,798		33,871
	Burn (1940-44)	210	18,015	29,318		47,333
	Plantation (1940-44)	365	1,725	40,701		42,426
	Cutover (1920-39)	1,428	27,517	171,919	2,879	202,315
	Reproduction (1910-39)	348	62,242	45,178		107,420
	Mature	170	7,241	486		7,727
	Stream	4	1,684			1,684
Second	All Types	3,131	136,497	303,400	2,879	442,776
	Cutover (1920-39)	786	32,393	20,671	100	53,164
	Reproduction (1910-39)	3,497	56,418	32,966	3,702	93,086
	Pole	241	12,349	32,966		45,315
	Mature	536	8,228	4,954	207	13,389
	Stream	1,713	128,111	22,718	50,861	201,690
	All Types	6,773	237,499	114,275	54,870	406,644
Third	Cutover (1920-39)	1,764	102,241	74,001		176,242
	Reproduction (1910-39)	3,214	34,831	30,248	223	65,302
	Pole	139	1,029	6		1,035
	Mature	199	4,673	45,525		50,198
	Stream	269	6,192	119	822	7,133
	All Types	5,585	148,966	149,899	1,045	299,910
	Cutover (1940-44)	606	18,073	15,798		33,871
All Workings	Burn (1940-44)	210	18,015	29,318		47,333
	Plantation (1940-44)	365	1,725	40,701		42,426
	Cutover (1920-39)	3,978	162,151	266,591	2,979	431,721
	Reproduction (1910-39)	7,059	153,491	108,392	3,925	265,808
	Pole	380	13,378	32,972		46,350
	Mature	905	20,142	50,965	207	71,314
	Stream	1,986	135,987	22,837	51,683	210,507
	All Types	15,489	522,962	567,574	58,794	1,149,330

TABLE 7

SUMMARY OF RIBES ERADICATION, 1923-1944
KANIKSU OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes Destroyed	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Cutover	1940-44	1,454	872	82,243	.60	57	1,454	39,080
	Burn	1940-44	210	184	47,333	.82	225	210	
	Plantation	1940-44	2,631	1,317	490,404	.50	186	2,631	
	Cutover	1920-39	9,852	6,842	1,666,648	.69	169	9,278	26,701
	Reproduction	1910-39	164,264	115,513	31,681,249	.70	193	157,645	27,952
	Pole		122,029	42,516	6,020,274	.35	49	120,714	31,794
	Mature		141,985	30,312	5,783,074	.21	41	114,690	43,585
	Miscellaneous		6,735	3,477	1,440,503	.52	214	5,372	2,172
	Stream		22,214	48,895	9,160,871	2.20	412	21,570	7,602
	Total		471,374	249,828	56,372,599	.53	120	433,564	178,886
Second	Cutover	1920-39	6,026	7,856	1,700,651	1.30	282	6,026	
	Reproduction	1910-39	42,127	37,071	5,161,581	.88	123	41,219	
	Pole		17,667	8,747	667,715	.50	38	17,667	
	Mature		6,075	3,220	338,524	.53	56	6,075	
	Miscellaneous		808	386	41,065	.48	51	808	
	Stream		7,019	10,859	1,168,715	1.55	167	6,964	
	Total		79,722	68,139	9,078,251	.85	114	78,759	
Third	Cutover	1920-39	1,904	2,186	190,412	1.15	100	1,904	
	Reproduction	1910-39	11,767	12,324	1,045,815	1.05	89	11,767	
	Pole		614	225	20,964	.37	34	614	
	Mature		304	270	51,582	.89	170	304	
	Miscellaneous		179	132	3,026	.68	17	179	
	Stream		1,040	1,351	60,880	1.30	59	1,040	
	Total		15,808	16,478	1,372,679	1.04	87	15,808	
All Workings	Cutover	1940-44	1,454	872	82,243	.60	57	1,454	39,080
	Burn	1940-44	210	184	47,333	.82	225	210	
	Plantation	1940-44	2,631	1,317	490,404	.50	186	2,631	
	Cutover	1920-39	17,782	16,884	3,557,711	.95	200	17,208	26,701
	Reproduction	1910-39	218,158	164,908	37,888,645	.76	174	210,631	27,952
	Pole		140,310	51,488	6,708,953	.37	48	138,995	31,794
	Mature		148,364	33,802	6,173,180	.23	42	121,069	43,585
	Miscellaneous		7,722	3,985	1,484,594	.52	192	6,359	2,172
	Stream		30,273	61,105	10,390,456	2.02	343	29,574	7,602
	Total		566,904	334,545	66,823,529	.59	118	528,131	178,886

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1944
KANIKSU OPERATION

State	Class	Gross Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
Idaho	EQ-Reg.	18,796	6,844	1,066,689	.36	57
	EQ-Coop.	125,445	45,166	10,637,809	.36	85
	EQ-Emerg.	93,041	68,851	11,333,497	.70	114
	FS-Reg.	37,940	37,542	4,470,744	.99	118
	FS-Emerg.	99,269	38,823	8,798,474	.39	89
	CCC	62,419	50,478	8,451,835	.81	125
	Total	442,910	247,704	44,749,048	.56	101
Washington	EQ-Emerg.	31,629	19,288	6,754,071	.61	214
	FS-Reg.	33,671	28,462	7,819,917	.85	232
	FS-Emerg.	36,366	14,386	4,013,260	.40	110
	CCC	22,328	24,705	3,487,233	1.11	156
	Total	123,994	86,841	22,074,481	.70	178
Idaho and Washington	EQ-Reg.	18,796	6,844	1,066,689	.36	57
	EQ-Coop.	125,445	45,166	10,637,809	.36	85
	EQ-Emerg.	130,670	88,139	18,087,568	.67	138
	FS-Reg.	71,611	66,004	12,290,661	.92	172
	FS-Emerg.	135,635	53,209	12,801,734	.39	94
	CCC	84,747	75,183	11,939,068	.89	141
	Total	566,904	334,545	66,823,529	.59	118

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1944
KANIKSU OPERATION

State	Working	Net Acres Worked in Control Area						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Idaho	First	176,138	54	176,192	104,781	64,780	169,561	345,753
	Second	34,500		34,500	16,554	9,489	26,043	60,543
	Third	2,095		2,095	7,214	1,208	8,922	11,017
	Total	212,733	54	212,787	128,549	75,477	204,526	417,314
Washington	First	80,948		80,948	2,080	4,783	6,863	87,811
	Second	17,118		17,118		1,098	1,098	18,216
	Third	4,593		4,593		192	192	4,791
	Total	102,659		102,659	2,080	6,073	8,153	110,818
Idaho and Washington	First	257,086	54	257,140	106,861	69,563	176,424	433,564
	Second	51,618		51,618	16,554	10,587	27,141	78,759
	Third	6,694		6,694	7,214	1,400	9,114	15,908
	Total	315,398	54	315,452	131,129	81,550	212,679	528,131

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1944
KANIKSU OPERATION

State	Ownership Class	Net Acres in Control Area		
		Worked	Unworked	Total
Idaho	National Forest	176,138	59,571	235,709
	Public Domain	54	80	134
	Subtotal Federal	176,192	59,651	235,843
	State	104,781	30,256	135,037
	Private	64,780	45,307	110,087
	Subtotal Other	169,561	75,563	245,124
Washington	Total	345,753	135,214	480,967
	National Forest	80,948	39,700	120,648
	State	2,080		2,080
	Private	4,783	3,972	8,755
	Subtotal Other	6,863	3,972	10,835
Washington and Idaho	Total	87,811	43,672	131,483
	National Forest	257,086	99,271	356,357
	Public Domain	54	80	134
	Subtotal Federal	257,140	99,351	356,491
	State	106,861	30,256	137,117
	Private	69,563	49,279	118,842
	Subtotal Other	176,424	79,535	255,959
	Total	433,564	178,886	612,450

TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1923-1944
KANIKSU OPERATION

Working	Eradication Type	Gross Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	Ribes acerifolium	
First	Cutover (1940-44)	1,454	45,670	36,573				82,243
	Burn (1940-44)	210	18,015	29,318				47,333
	Plantation (1940-44)	2,631	72,450	417,954				490,404
	Cutover (1920-39)	9,852	651,755	967,010	47,883			1,666,648
	Reproduction (1910-39)	164,264	9,302,481	22,149,719	226,102	2,947		31,681,249
	Pole	122,029	2,884,265	2,901,946	208,435	21,714	3,914	6,020,274
	Mature	141,985	4,011,599	1,614,889	154,559		2,027	5,783,074
	Miscellaneous	6,735	338,295	1,033,671	68,537			1,440,503
	Stream	22,214	4,860,832	425,512	3,854,943		19,584	9,160,871
Second	All Types	471,374	22,185,362	29,576,592	4,560,459	24,661	25,525	56,372,599
	Cutover (1920-39)	6,026	359,392	1,327,311	13,948			1,700,651
	Reproduction (1910-39)	42,127	1,491,718	3,634,652	35,211			5,161,581
	Pole	17,667	314,269	342,303	11,143			667,715
	Mature	6,075	172,318	162,125	4,081			338,524
	Miscellaneous	808	24,827	15,363	875			41,065
	Stream	7,019	639,534	73,739	455,442			1,168,715
Third	All Types	79,722	3,002,058	5,555,493	520,700			9,078,251
	Cutover (1920-39)	1,904	104,670	80,741	5,001			190,412
	Reproduction (1910-39)	11,767	306,869	736,315	2,631			1,045,815
	Pole	614	7,307	13,532	125			20,964
	Mature	304	5,386	46,196				51,582
	Miscellaneous	179	1,109	1,893	24			3,026
	Stream	1,040	45,469	4,209	11,202			60,880
All Workings	All Types	15,808	470,810	882,886	18,983			1,372,679
	Cutover (1940-44)	1,454	45,670	36,573				82,243
	Burn (1940-44)	210	18,015	29,318				47,333
	Plantation (1940-44)	2,631	72,450	417,954				490,404
	Cutover (1920-39)	17,782	1,115,817	2,375,062	66,832			3,557,711
	Reproduction (1910-39)	218,158	11,101,068	26,520,686	263,944	2,947		37,888,645
	Pole	140,310	3,205,841	3,257,781	219,703	21,714	3,914	6,708,953
	Mature	148,364	4,189,303	1,823,210	158,640		2,027	6,173,180
	Miscellaneous	7,722	364,231	1,050,927	69,436			1,484,594
	Stream	30,273	5,545,835	503,460	4,321,587		19,584	10,390,466
	All Types	566,904	25,658,230	36,014,971	5,100,142	24,661	25,525	66,823,529

BLISTER RUST CONTROL WORK, MONTANA OPERATION, 1944

By

A. S. Skoglund, Operation Supervisor

INTRODUCTION

Blister rust control activities on the Montana operation were conducted on both the Cabinet and Kootenai National Forests.

A total of 5,985 acres were worked in 1944 which brings the net progress for the Montana operation to 129,166 acres worked initially and 14,692 acres reworked. Approximately 74,187 acres are in need of initial ribes eradication.

ORGANIZATION AND ADMINISTRATION

The Forest Service was responsible for the administration and maintenance of the camps and technical supervision was provided by the Bureau of Entomology and Plant Quarantine. The field organization was directed by A.S. Skoglund.

Two camps were operated on the Cabinet Forest with a peak of 122 employed. The first camp was established at Bull River Ranger Station on April 19. The second camp was located at Noxon Ranger Station and was established on June 1. One camp of 76 workers was established during May and located on the shores of Spar Lake in the Kootenai Forest. All of the camps were closed the last week of August.

LOCATION AND DESCRIPTION OF AREAS

In the Cabinet Forest work was performed in the Bull River drainage and in and near Noxon, Montana. Initial work was given the Snake Creek area which is a thrifty 55-year old white pine stand relatively light in ribes. Several snowslides in 1936 on the East Fork of Bull River created an area containing thousands of ribes per acre in what was previously a relatively ribes-free pole stand. Initial work was performed on this area.

Rework was performed on Star Gulch, Carmichael Gulch and all the major stream type along Bull River. The upland ribes were mainly Ribes viscosissimum whereas mostly R. inerme were removed in the stream type. All of the above work is included in secs. 32 and 34 of T. 28 N., R. 32 W.; secs. 32 and 33 of T. 28 N., R. 33 W.; secs. 2, 3, 4, 5, 6, 7, 8, 10, 11, 12 and 18 of T. 27 N., R. 32 W.; sections 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 of T. 27 N., R. 33 W.

Initial work in and around Noxon and Heron was performed in 55-year old stands of white pine relatively light in ribes and infection. Work performed in Rock Creek was a continuation of that started in 1943 and consisted of both initial and rework. This work is included in secs. 19 and 33 of T. 26 N., R. 32 W., secs. 23, 24 and 25 of T. 26 N., R. 33 W.; secs. 34 and 35 of T. 27 N., R. 34 W.

Work in the Kootenai Forest was confined mostly to the area in the vicinity of Spar Lake. This area is mainly composed of a 55-year old stand of thrifty pole light in ribes with only a small amount of infection. The rim above the pole is of mature type with some heavy concentrations of ribes. Several small precipitous drainages west of the lake contained very heavy concentrations of ribes difficult to remove. The entire area represents some of the most rugged topography in the control area. These workings are located in secs. 15, 16, 17, 20, 21, 27, 28 and 33 of T. 29 N., R. 34 W.

A small amount of work was performed in secs. 5 and 6 of T. 29 N., R. 33 W. This area was cut in 1939 and R. irriguum have germinated throughout the area.

METHODS AND EQUIPMENT

The same methods and procedures were used as last year. Each area and to some extent each crew must be analyzed and various procedures and methods applied in order to effect the greatest accomplishment.

Special training was given to selected boys in order to help develop and prepare them for more responsible jobs. Three boys were thus trained to prepare them as straw bosses for next season and four boys were trained as checkers.

CHECKING

A regular four percent check was performed on all upland areas worked this past season. Portions of areas that did not meet efficiency standards were then reworked but not rechecked. Economic as well as ecological factors must be considered in applying and interpreting checks performed on small rework areas. A post check supplemented by a disease survey will be applied to these and surrounding areas as soon as an effective check can be performed. Two checkers performed all the regular check this past season, assisted by four boys selected and trained during August as checkers for 1945.

SURVEYS AND CONTROL STATUS

The status of control in the Cabinet Forest is practically the same as last year. There have been 78,401 acres initially worked in the net control area of which 42,931 acres are on maintenance, 13,655 acres are on post check and 21,765 acres are to be reworked. There remain 16,244 acres to be initially worked.

A check was made of the transplant and seedling stock in the nursery beds at Savenac. One hundred fifty infected specimens were found in a check of 18,000 samples of 2-2 transplant stock sown in the fall of 1939 and transplanted in 1942. This represents .33 percent infection. An inspection of 8,000 specimens of two-year old seedling stock sown in the fall of 1942 disclosed one infected seedling. This inspection of the seedling stock may give us the first positive check on a source of inoculum and the effectiveness of control by removal of the ribes from Haugan Lookout. These pine seedlings are the first

ones germinated since the removal of 3,000 ribes per acre from Haugan Lookout.

Seedling stock is to be transplanted this coming season to the old nursery along Savenac Creek. This will necessitate a reworking of the stream type and spraying of the masses of R. petiolare one mile upstream from the nursery beds.

A check of the upper plantation on the middle fork of Big Creek revealed scattering new infection especially near the upper end. The control boundary should be extended five to twenty chains to the ridge to prevent this infiltration of spores from the ribes on the higher slopes.

The status of control in the Kootenai Forest has changed considerably during the past several years. There have been 50,765 acres initially worked in the net control area of which 27,742 acres are on maintenance, 13,310 acres are on post check and 9,713 acres to be reworked. There remain 57,943 acres to be worked of which 10,864 acres are in cutover type.

Extensive logging operations have reduced the mature stands with relatively light ribes to cutover type of varying ribes conditions. Star, Ruby, Keeler, Stanley and Lake Creek areas have recently been logged or are now being logged. These operations involve the shifting of 9,616 acres of mature type to that of cutover.

A part of the Star Creek sale was broadcast burned in 1942 and will be planted during 1945. This area supports about 25 ribes per acre and should be initially worked next summer prior to telial production.

The lower portion of the North Fork of Keeler Creek area has been logged but as yet there has not been much reseeding of either pine or ribes. It appears that initial working of this cutover type may be postponed until the entire area has been logged.

The lower Stanley Creek sale area has had a fire which has left the area in an unproductive state. This is a likely unit for a hazard reduction operation followed by planting.

Several centers of pine infection of 1938 origin have been found in the Lake Creek cutover area. This area should be worked this coming season to prevent any intensification or spread.

Occasional cankers were found this past season in and around Spar Lake though most of them were in the draws and near the streams. Ribes eradication work performed this year should suffice to afford permanent protection to the pole stand in Hiatt Creek.

Three new areas, Barren, Bristow and Burnt Creeks, have been added to the blister rust control unit. The mature trees in Barren Creek are being logged by the shelterwood method and it is planned to protect the residual pole and

reproduction that will remain for the second cutting. Present conditions indicate that most of the work will occur along the streams, roads, skid trails and landings. The lower portion of Bristow Creek supports a stringer of white pine pole with light ribs. The upper portion of Bristow Creek is being selectively logged by the seed tree method of the white pine and spruce. These two drainages represent a compact management unit that can be protected from blister rust at a nominal cost.

The Burnt Creek area is one of 45 to 50-year old white pine pole with working conditions being not too difficult. An occasional canker was found in the upper stream zones which represent the most difficult eradication sites as well as most optimum conditions for spread of pine infection. An advance survey and some work should be performed in this area next season.

During the past two seasons the control areas have been classified in order to better determine their status relative to control and pine producing capacities. As a result of this survey certain areas which had been worked were dropped from the control area as not warranting additional expenditures. Also, several mature areas which had been worked have subsequently been logged and are now classed as unworked cutover type.

This year, in order to present a better analysis of actual progress in accomplishing control, a distinction has been made between gross acres and net acres. Henceforth, gross acres shall refer to total acres worked in each type, including those dropped from the control area or logged, whereas net acres shall refer to the actual amounts of each type now remaining in the control area. These changes make it possible to present amounts of acres by types worked or unworked in the control area. A total of 2,923 acres of worked mature type have been logged and are now classified as unworked cutover. A total of 1,121 acres of various types have been dropped from the control area in the Cabinet Forest because of fires, blister rust damage, non-white pine regeneration, etc.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs by cooperative agency and type of appropriation is shown in the following tabulations:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1944
MONTANA OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 2,630.75
Forest Service	Regular BLR-4	71,735.78
Total		\$74,366.53

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1944
MONTANA OPERATION

Item	Bureau of Entomology and Plant Quarantine	Forest Service	Total
	Regular BLR-1-4	Regular BLR-4	
Sal., perm. men	\$2,241.48	\$ 2,861.78	\$ 5,103.26
Wages, temp. labs.		52,523.00	\$52,523.00
Subs. supplies		\$11,907.00	11,907.00
Equipment		2,397.00	2,397.00
Travel and transp.	382.03	994.00	1,376.03
Other supplies	7.24	1,053.00	1,060.24
Total	\$2,630.75	\$71,735.78	\$74,366.53

TABLE 3

SUMMARY OF RIBES ERADICATION, 1944
MONTANA OPERATION

Forest	Working	Eradication Type	Year of Origin	Acres Worked	Man-Days	Ribes Destroyed	Per Acre	
							Man-Days	Ribes
Kootenai	First	Cutover	1920-39	44	18	574	.41	13
		Reproduction	1910-39	145	81	2,906	.56	20
		Pole		1,186	623	39,653	.53	33
		Mature		772	828	112,439	1.07	146
		Stream		179	969	119,301	5.41	666
		Total		2,326	2,519	274,873	1.08	118
Cabinet	First	Reproduction	1910-39	136	781	43,291	5.74	318
		Pole		1,898	61	3,798	.03	2
		Miscellaneous		282	5	95	.02	1
		Stream		42	221	28,684	5.26	683
		Total		2,358	1,068	75,868	.45	32
		Reproduction	1910-39	105	562	31,744	5.35	302
	Second	Pole		325	673	12,292	2.07	38
		Mature		16	12	343	.75	21
		Miscellaneous		33	34	1,503	1.03	46
		Stream		606	1,532	59,018	2.53	97
		Total		1,085	2,813	104,900	2.59	97
	Third	Pole		75	50	1,390	.67	19
		Stream		141	363	20,208	2.57	143
		Total		216	413	21,598	1.91	100
	All Workings	Reproduction	1910-39	241	1,343	75,035	5.57	311
		Pole		2,298	784	17,480	.34	8
		Mature		16	12	343	.75	21
		Miscellaneous		315	39	1,598	.12	5
		Stream		789	2,116	107,910	2.68	137
		Total		3,659	4,294	202,366	1.17	55
All Forests	First	Cutover	1920-39	44	18	574	.41	13
		Reproduction	1910-39	281	862	46,197	3.07	164
		Pole		3,084	684	43,451	.22	14
		Mature		772	828	112,439	1.07	146
		Miscellaneous		282	5	95	.02	1
		Stream		221	1,190	147,985	5.38	670
		Total		4,684	3,587	350,741	.77	75
	Second	Reproduction	1910-39	105	562	31,744	5.35	302
		Pole		325	673	12,292	2.07	38
		Mature		16	12	343	.75	21
		Miscellaneous		33	34	1,503	1.03	46
		Stream		606	1,532	59,018	2.53	97
		Total		1,085	2,813	104,900	2.59	97
	Third	Pole		75	50	1,390	.67	19
		Stream		141	363	20,208	2.57	143
		Total		216	413	21,598	1.91	100
	All Workings	Cutover	1920-39	44	18	574	.41	13
		Reproduction	1910-39	386	1,424	77,941	3.69	202
		Pole		3,484	1,407	57,133	.40	16
		Mature		788	840	112,782	1.07	143
		Miscellaneous		315	39	1,598	.12	5
		Stream		968	3,085	227,211	3.19	235
		Total		5,985	6,813	477,239	1.14	80

TABLE 4

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1944
MONTANA OPERATION

Forest	Working	Number of Acres Worked by Forest Service		
		National Forest	Private	Total
Kootenai	First	2,282	44	2,326
Cabinet	First	729	1,629	2,358
	Second	733	352	1,085
	Third	39	177	216
	Total	1,501	2,158	3,659
All Forests	First	3,011	1,673	4,684
	Second	733	352	1,085
	Third	39	177	216
	Total	3,783	2,202	5,985

TABLE 5

TOTAL RIBES BY SPECIES ERADICATED, 1944
MONTANA OPERATION

Forest	Working	Eradication Type	Acres	Ribes by Species					Total Ribes
				Ribes lacustre	Ribes viscosissimum	Ribes inermis	Ribes irriguum	Ribes coloradense	
Kootenai	First	Cutover (1920-39)	44	403	2	72	97		574
		Reproduction (1910-39)	145	2,810	33			63	2,906
		Pole	1,186	29,650	9,701			302	39,653
		Mature	772	111,106	1,333				112,439
		Stream	179	117,224	877			1,200	119,301
		Total	2,326	261,193	11,946	72	97	1,565	274,873
Cabinet	First	Reproduction (1910-39)	136	39,371	3,737	183			43,291
		Pole	1,898	1,247		2,551			3,798
		Miscellaneous	282	95					95
		Stream	42	6,267	737	21,680			28,684
		Total	2,358	46,980	4,474	24,414			75,868
	Second	Reproduction (1910-39)	105	16,346	15,398				31,744
		Pole	325	5,944	6,348				12,292
		Mature	16	343					343
		Miscellaneous	33	877	626				1,503
		Stream	606	29,392	863	28,763			59,019
		Total	1,085	52,902	23,235	28,763			104,900
	Third	Pole	75	730		660			1,390
		Stream	141	4,590	112	15,506			20,208
		Total	216	5,320	112	16,166			21,598
	All Workings	Reproduction (1910-39)	241	55,717	19,135	183			75,035
		Pole	2,298	7,921	6,348	3,211			17,480
		Mature	16	343					343
		Miscellaneous	315	972	626				1,598
		Stream	789	40,249	1,712	65,949			107,910
		Total	3,659	105,202	27,821	69,343			202,366
All Forests	First	Cutover (1920-39)	44	403	2	72	97		574
		Reproduction (1910-39)	281	42,181	3,770	183		63	46,197
		Pole	3,084	30,897	9,701	2,551		302	43,451
		Mature	772	111,106	1,333				112,439
		Miscellaneous	282	95					95
		Stream	221	123,491	1,614	21,680		1,200	147,985
		Total	4,684	308,173	16,420	24,486	97	1,565	350,741
	Second	Reproduction (1910-39)	105	16,346	15,398				31,744
		Pole	325	5,944	6,348				12,292
		Mature	16	343					343
		Miscellaneous	33	877	626				1,503
		Stream	606	29,392	863	28,763			59,019
		Total	1,085	52,902	23,235	28,763			104,900
	Third	Pole	75	730		660			1,390
		Stream	141	4,590	112	15,506			20,208
		Total	216	5,320	112	16,166			21,598
	All Workings	Cutover (1920-39)	44	403	2	72	97		574
		Reproduction (1910-39)	386	58,527	19,168	183		63	77,941
		Pole	3,484	37,571	16,049	3,211		302	57,133
		Mature	788	111,449	1,333				112,782
		Miscellaneous	315	972	626				1,598
		Stream	968	157,473	2,589	65,949		1,200	227,211
		Total	5,985	366,395	39,767	69,415	97	1,565	477,239

TABLE 6

SUMMARY OF RIBES ERADICATION, 1928-1944
MONTANA OPERATION

Forest	Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes Destroyed	Per Acre		Net Acreage Remaining	
							Men-Days	Ribes	Worked	Unworked
Kootenai	First	Cutover	1940-44							5,739
		Cutover	1920-39	44	18	574	.41	13	44	5,125
		Reproduction	1910-39	13,164	8,700	1,079,255	.66	82	12,430	10,635
		Pole		20,070	7,846	851,134	.39	42	19,158	19,454
		Mature		16,791	4,367	594,358	.26	35	15,786	16,990
		Miscellaneous		346	95	7,956	.27	23	346	-
		Stream		3,229	9,146	1,333,460	2.83	413	3,001	-
		Total		53,644	30,172	3,866,737	.66	72	50,765	57,943
	Second	Reproduction	1910-39	341	165	25,522	.48	75	341	-
		Pole		779	607	40,490	.78	52	779	-
		Stream		533	805	62,875	1.51	118	305	-
		Total		1,653	1,577	128,897	.95	78	1,425	-
	All Workings	Cutover	1920-39	44	18	574	.41	13	44	-
		Reproduction	1910-39	13,505	8,665	1,104,777	.66	82	12,771	-
		Pole		20,849	8,453	891,624	.41	43	19,937	-
		Mature		16,791	4,367	594,358	.26	35	15,786	-
		Miscellaneous		346	95	7,956	.27	23	346	-
		Stream		3,762	9,951	1,396,335	2.65	371	3,306	-
		Total		55,297	31,743	3,995,624	.57	72	52,190	-
		Reproduction	1910-39	29,365	29,682	5,616,402	1.01	191	28,796	7,318
Cabinet	First	Pole		25,959	9,213	1,745,885	.35	67	25,670	7,134
		Mature		9,297	4,447	1,064,328	.48	114	9,277	1,792
		Miscellaneous		4,900	2,230	596,499	.46	122	4,657	-
		Stream		3,913	13,089	3,008,221	3.35	769	3,913	-
		Total		73,434	58,661	12,031,335	.80	164	72,313	16,244
	Second	Reproduction	1910-39	5,095	7,279	728,027	1.43	143	5,095	-
		Pole		1,108	1,423	101,767	1.28	92	1,108	-
		Mature		28	27	1,799	.96	64	28	-
		Miscellaneous		33	34	1,503	1.03	46	33	-
		Stream		1,991	4,238	248,280	2.13	125	1,991	-
		Total		8,255	13,001	1,041,376	1.97	191	8,255	-
	Third	Reproduction	1910-39	1,092	906	77,575	.83	71	1,092	-
		Pole		125	149	7,256	1.19	58	125	-
		Stream		492	837	68,704	1.70	140	492	-
		Total		1,709	1,892	153,535	1.11	90	1,709	-
	All Workings	Reproduction	1910-39	35,552	37,867	6,422,004	1.07	181	34,983	-
		Pole		27,192	10,785	1,854,908	.40	68	26,903	-
		Mature		9,325	4,474	1,066,127	.48	114	9,305	-
		Miscellaneous		4,933	2,264	598,002	.46	121	4,690	-
		Stream		6,396	18,164	3,325,205	2.84	520	6,396	-
		Total		83,398	73,554	13,266,246	.88	159	82,277	-
	Sevensc Nursery	Reproduction	1910-39	5,000	1,698	521,650	.34	104	5,000	0
		Stream		1,088	2,655	583,169	2.44	536	1,088	0
		Total		6,088	4,343	1,104,819	.71	181	6,088	0
	Second	Reproduction	1910-39	179	186	34,173	1.04	191	179	-
		Stream		999	1,157	310,073	1.16	310	999	-
		Total		1,178	1,343	344,246	1.14	292	1,178	-
	Third and Other	Reproduction	1910-39	85	70	4,079	.82	48	85	-
		Stream		2,040	2,163	83,579	1.06	41	2,040	-
		Total		2,125	2,233	87,658	1.05	41	2,125	-
	All Workings	Reproduction	1910-39	5,264	1,944	559,902	.37	106	5,264	-
		Stream		4,127	5,975	976,821	1.45	237	4,127	-
		Total		9,391	7,919	1,536,723	.84	164	9,391	-
All Forests	First	Cutover	1940-44							5,739
		Cutover	1920-39	44	18	574	.41	13	44	5,125
		Reproduction	1910-39	47,529	40,070	7,217,307	.84	152	46,226	17,953
		Pole		46,029	17,059	2,597,019	.37	56	44,828	26,588
		Mature		26,088	8,814	1,658,686	.34	64	25,063	18,782
		Miscellaneous		5,246	2,325	604,455	.44	115	5,003	-
		Stream (1)		8,230	24,890	4,924,850	3.02	598	8,002	-
		Total		133,166	93,176	17,002,891	.70	128	129,166	74,187
	Second	Reproduction	1910-39	5,615	7,630	787,722	1.36	140	5,615	-
		Pole		1,887	2,030	142,257	1.08	75	1,887	-
		Mature		28	27	1,799	.96	64	28	-
		Miscellaneous		33	34	1,503	1.03	46	33	-
		Stream (2)		3,523	6,200	621,228	1.76	176	3,295	-
		Total		11,086	15,921	1,554,509	1.44	140	10,858	-
	Third and Other	Reproduction	1910-39	1,177	976	81,654	.83	69	1,177	-
		Pole		125	149	7,256	1.19	58	125	-
		Stream (3)		2,532	3,000	152,283	1.18	60	2,532	-
		Total		3,834	4,125	241,193	1.08	63	3,834	-
	All Workings	Cutover	1940-44							5,739
		Cutover	1920-39	44	18	574	.41	13	44	5,125
		Reproduction	1910-39	54,321	48,676	8,086,683	.90	149	53,018	17,953
		Pole		48,041	19,238	2,746,532	.40	57	46,840	26,588
		Mature		26,116	8,841	1,660,485	.34	64	25,091	18,782
		Miscellaneous		5,279	2,359	605,958	.45	115	5,036	-
		Stream (4)		14,285	34,090	5,698,361	2.39	399	13,829	-
		Total		148,086	114,222	18,798,593	.76	127	143,858	74,187

Chemical work included above:

	Acres	Men-Days	Gallons Sprey
(1)	704	1,957	57,825
(2)	178	379	11,146
(3)	12	148	3,545
(4)	894	2,484	72,516

TABLE 7

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1928-1944
MONTANA OPERATION

Class	Gross Acres	Effective Man-Days	Ribes Destroyed	Gallons Spray	Per Acre Basis	
					Man-Days	Ribes
EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380
EQ-Emergency	66,076	30,737	5,775,415	1,330	.47	87
FS-Reg.	29,821	31,090	3,421,736	8,428	1.04	115
FS-Emergency	35,712	35,620	7,367,723	21,538	1.00	206
CCC	14,475	12,440	1,472,009	6,325	.86	102
Total	148,086	113,222	18,793,593	72,516	.76	127

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1928-1944
MONTANA OPERATION

Forest	Working	Net Acres Worked in Control Area						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Kootenai	First	48,567		48,567		2,198	2,198	50,765
	Second	1,165		1,165		260	260	1,425
	Total	49,732		49,732		2,458	2,458	52,190
Cabinet	First	61,542	40	61,582	734	16,085	16,819	78,401
	Second	7,512		7,512	1	1,920	1,921	9,433
	Third	2,283		2,283		1,551	1,551	3,834
	Total	71,337	40	71,377	735	19,556	20,291	91,668
All Forests	First	110,109	40	110,149	734	18,283	19,017	129,166
	Second	8,677		8,677	1	2,180	2,181	10,858
	Third	2,283		2,283		1,551	1,551	3,834
	Total	121,069	40	121,109	735	22,014	22,749	143,858

TABLE 9

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1928-1944
MONTANA OPERATION

Forest	Ownership Class	Net Acres in Control Area		
		Worked	Unworked	Total
Kootenai	National Forest	48,567	45,790	94,357
	State-Montana		173	173
	Private	2,198	11,980	14,178
	Subtotal Other	2,198	12,153	14,351
	Total	50,765	57,943	108,708
Cabinet	National Forest	61,542	12,052	73,594
	Public Domain	40		40
	Subtotal Federal	61,582	12,052	73,634
	State	734		734
	Private	16,085	4,192	20,277
	Subtotal Other	16,819	4,192	21,011
	Total	78,401	16,244	94,645
All Forests	National Forest	110,109	57,842	167,951
	Public Domain	40		40
	Subtotal Federal	110,149	57,842	167,991
	State	734	173	907
	Private	18,283	16,172	34,455
	Subtotal Other	19,017	16,345	35,362
	Total	129,166	74,187	203,353

TABLE 10

TOTAL RIBES BY SPECIES ERADICATED, 1928-1944
MONTANA OPERATION

Working	Eradication Type	Gross Acres	Ribes by Species							Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inermis	Ribes irriguum	Ribes coloradense	Ribes triste	
First	Cutover (1920-39)	44	403	2		72	97			574
	Reproduction (1910-39)	47,529	3,396,335	3,641,041	4,714	55,752	114,802	3,518	1,145	7,217,307
	Pole	46,029	1,456,332	952,091	200	103,756	84,338	302		2,597,019
	Mature	26,088	1,452,632	178,729	259	11,080	8,729	7,257		1,658,686
	Miscellaneous	5,246	291,724	295,188		12,381	5,162			604,455
	Stream	8,230	3,162,771	119,767	266,006	1,316,334	5,744	33,105	21,123	4,924,850
	Total	133,166	9,760,197	5,186,818	271,179	1,499,375	218,872	44,182	22,268	17,002,891
Second	Reproduction (1910-39)	5,615	462,752	302,185	4,860	4,668	10,666		2,591	787,722
	Pole	1,887	104,166	30,632	119	6,419	921			142,257
	Mature	28	1,799							1,799
	Miscellaneous	33	877	626						1,503
	Stream	3,523	195,589	5,776	43,208	352,846	10,975		7,834	621,228
	Total	11,086	765,183	339,219	53,187	363,933	22,562		10,425	1,554,509
	Reproduction (1910-39)	1,177	47,600	33,647	93		200		114	81,654
Third	Pole	125	1,530	5,060		660	6			7,256
	Stream	2,532	22,422	451	35,905	77,763			15,742	152,285
	Total	3,834	71,552	39,158	35,998	78,423	206		15,856	241,193
	Cutover (1920-39)	44	403	2		72	97			574
	Reproduction (1910-39)	54,321	3,906,687	3,976,873	9,667	60,420	125,668	3,518	3,850	8,086,683
	Pole	48,041	1,562,028	987,783	319	110,835	85,265	302		2,746,532
	Mature	26,116	1,454,431	178,729	259	11,080	8,729	7,257		1,660,485
All Workings	Miscellaneous	5,279	292,601	295,814		12,381	5,162			605,958
	Stream	14,285	3,380,782	125,994	350,119	1,746,943	16,719	33,105	44,699	5,698,361
	Total	148,086	10,596,932	5,565,195	360,364	1,941,731	241,640	44,182	48,549	18,798,593

BLISTER RUST CONTROL, MOUNT RAINIER NATIONAL PARK, 1944

By

M. C. Riley, Operation Supervisor

White pine blister rust control work on Mount Rainier National Park during 1944 was conducted by a maximum crew of 30 men and financed with regular funds. The season extended from June 7 to August 31 and work was done both on ribes eradication and canker elimination on the Longmire and White River areas. Activities started on the Longmire area and the crew moved to White River on July 5. Less time was lost because of inclement weather than for several years and there was less labor turnover than has been previously experienced with youthful workers. The work was supervised by an experienced foreman and an assistant.

Ribes eradication was performed on 289 acres on the Longmire-Silver Forest area and 347 acres on the White River area and consisted entirely of third working. The Silver Forest portion of the Longmire area was worked east of the highway from the east end of the Miller cut-off nearly to Narada Falls and portions of the area north of Canyon Rim were also covered. Stream type was worked on the tributaries of Paradise River which occur in and adjacent to the Silver Forest. This lies in unsurveyed secs. 14, 22, 23 and 24, T. 15 N., R. 8 E., Willamette Meridian. At White River ribes eradication was performed on portions of the area between Rockcrusher Point and Sunrise Point and is located in unsurveyed secs. 31 and 32, T. 17 N., R. 10 E., Willamette Meridian.

No regular strip checks were run on any of the area worked this year because no checker was available. The foreman and his assistant were able to furnish enough close supervision so that it is felt a satisfactory quality of work was performed.

In addition to the ribes eradication work, canker elimination was performed on the Silver Forest and White River areas. This work on the Silver Forest was a continuation of that started in 1943 and completed initial coverage of the white pine area. Canker elimination was performed on 38 acres with an expenditure of 53 man-days, resulting in the inspection of 2,532 trees with 10,283 cankers removed from 1,455 infected trees. At White River the initial canker elimination work was completed to the west end of the white pine area and rework was completed on all of the area previously treated. There were 40,533 trees examined on 1,917 acres in 533 man-days resulting in the removal of 84,433 cankers from 23,166 infected trees.

A representative of the Bureau of Entomology and Plant Quarantine helped plan, organize and supervise the work. The Bureau also supplied the necessary maps, forms, and office supplies for the proper recording and reporting of data.

CONTROL STATUS

Since blister rust control work was started on Mount Rainier National Park in 1930, ribes eradication has been performed on four areas. Two of these,

Starbo and Stevens Canyon, are no longer considered in the control area. The Starbo area was dropped when it was determined that the pine values were not commensurate with the cost of maintaining blister rust control. The Stevens Canyon area was dropped because of the large amount of pine infection present which will result in practically a total loss of the pine. Infection on pine had been found prior to the initiation of ribes eradication work there in 1932. For a number of years it was felt that a high percentage of the white pine could be saved but because of lack of ample appropriations and the insufficient number of workers assigned to the area during the CCC program, when the establishment of side camps presented so many problems, it was not possible to stem the devastation. No work has been performed here since 1941.

On the two remaining areas, Longmire-Silver Forest and White River, which involve a total control area of 3,581 acres, ribes eradication has progressed to the point where the areas are now in a satisfactory condition which can be maintained at a reasonable cost. Blister rust infection was present in the pine on the Longmire-Silver Forest area when control work was initiated in 1930 and was first found on pine on the White River area in 1937 although infected ribes were known to be present in the vicinity prior to any control work. In the course of the last 15 years during all of which time the control program was behind schedule, more than 50 per cent of the pine trees became infected. This condition is not as serious as it might appear since the successive reductions in ribes had greatly retarded the intensity of spread of infection from ribes to pine and the number of cankers per tree was relatively small with only a few of the cankers being damaging. The cankers removed thus far are an accumulation of a number of years' infection when there were many more ribes present than is now the case. On the Longmire portion of the area not a single tree has been lost thus far and a total of only about 12 small trees on the Silver Forest portion and at White River had to be removed because of killing cankers.

While the control status on these areas is approaching a maintenance basis, the removal of significant numbers of ribes is all too recent to permit making accurate estimates of what follow-up work might be involved, yet it is now possible to foresee what will be required and outline within reasonable limits what the future control program on these areas should involve.

RECOMMENDATIONS

The following estimates are based upon ground conditions as they now exist and naturally cannot take into consideration any ground disturbances such as those caused by fire, erosion, floods which change stream courses, road or trail construction and landscaping activities, all of which induce germination of ribes seed.

Longmire-Silver Forest. In 1945 a 25-man field crew for a period of three months is needed to rework stream type at Longmire and along Nisqually and Paradise Creeks and portions of the upland in the Silver Forest. No further

work will be required for three years if the programmed work for 1945 is completed. The maximum future requirements would involve one more complete reworking of the upland and stream types which would require a 25-man crew for three months, plus periodic checking and reworking where necessary in stream type. At this time, 1948 appears to be the logical time to perform this work, the actual extent of which should be determined by an intensive ribes check and disease survey in 1947. After 1948, no further work should be required in the upland types except where disturbances have occurred. The principal problem in maintaining a ribes-free condition occurs in stream type where ribes were originally found in great numbers. The recurrence of ribes seedlings adjacent to streams has been particularly troublesome but the number found in 1944 as compared with those encountered in 1943 indicates that this condition is becoming less of a factor. A periodic check-up and reworking, if necessary, should be done in stream type every five years. It is estimated that a 15-man crew for the year in which the work would be done would be sufficient. It is expected that after about two of these periodic workings in stream type the interval could be extended. With the ribes well suppressed, it is deemed advisable to minimize the damage which may result from infection present in the pine by supplementing any future ribes eradication work with a program of canker elimination. A total of 202 man-days have been used on this work in the past to remove visible cankers. It is reasonable to estimate this work would not involve more than 300 additional man-days over the next ten-year period.

White River. Under normal conditions of rust spread and with no ground disturbances the suppression of ribes on the White River area has reached a maintenance status. The 347 acres reworked in 1944 which had not received satisfactory workings under the CCC program represented the acreage which did not meet control standards. A thorough coverage was made and only 8 ribes per acre were found and these were in localized spots. Both upland and stream type are in good condition. For the protection of the western white pine at the lower elevations and at White River camp ground very little maintenance work would be required. However, the highly susceptible whitebark pine occurs on a large portion of the area. It has recently been determined that this species of pine will contract the rust under favorable moisture conditions and from highly susceptible ribes such as Ribes bracteosum, both of which conditions exist on Mount Rainier National Park, over greater distances than had previously been realized. This ribes species has been eradicated for a distance of one mile from the whitebark pine on the White River area. In view of this susceptibility of whitebark pine it can also be assumed that under favorable conditions spread of the rust can take place from other ribes species from beyond the quarter mile protection zone which has been established. Thus far on this area it has not been possible to determine what pine infection is a result of long distance spread because, until this year, these trees have been exposed to ribes in close proximity. The following of a more adequate schedule on ribes eradication on the White River area has prevented the loss of pine which has taken place on the Stevens Canyon area. If it develops that infection of the whitebark pine is coming from a long distance it would not be advisable to extend the protection zones because of the tremendous cost involved. The infection caused by local ribes or those at greater distances has

been removed at nominal cost by a program of canker elimination. It is believed that this procedure can be followed and will result in preserving the pine for many decades.

The estimated future control requirements on the White River area are as follows:

An intensive ribes check and pine disease survey in 1946 to determine reworking needs. On the basis of present knowledge of conditions, it is not anticipated that much work would be required in 1947. As in the case of the Longmire-Silver Forest area, stream type will need reworking about every five years. This should be supplemented with a canker elimination program. These jobs can be handled with a 25-man field crew for three months. After about 10 years the five-year interval can probably be extended.

SUMMARY OF RECOMMENDATIONS AND ESTIMATES

1. Longmire-Silver Forest Area

1945 Ribes eradication	25 man crew for 3 months
1947 Ribes check and disease survey	1 man for 3 months
1948 Ribes eradication and canker elimination	25 man crew for 3 months
1953 " " " "	20 man " " " "
1958 " " " "	20 man " " " "

2. White River Area

1946 Ribes check and disease survey	2 men for 3 months
1947 Ribes eradication and canker elimination	25 man crew for 3 months
1952 " " " "	25 " " " " "
1957 " " " "	25 " " " " "

RESULTS

The following tables show statements of expenditures, results of the 1944 field work and accumulative results for all work done to date.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1944
MOUNT RAINIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 452.35
National Park Service	Regular BLR-5	11,543.83
Total		\$11,996.18

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1944
MOUNT RAINIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	Regular BLR-5	
Sal. perm. men	\$344.02		\$ 344.02
Personal services		\$11,318.20	11,318.20
Travel and transp.	108.33		108.33
Contractual services		211.79	211.79
Supplies and material		13.84	13.84
Total	\$452.35	\$11,543.83	\$11,996.18

TABLE 3

SUMMARY OF RIBES ERADICATION, 1944
MOUNT RAINIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species							Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes bracteosum	Ribes watsonianum	Ribes laxiflorum	Ribes acerifolium	Ribes sanguineum	Ribes		Man-Days	Ribes
Longmire	Third	Pole	269	295	4,834	850		172	114	9		5,979	1.10	22
		Stream	20	19	76	523		13	50			662	.95	33
		Total	289	314	4,910	1,373		185	164	9		6,641	1.09	23
White River All Areas	Third	Pole	347	247	266		2,307		301			2,874	.71	8
		Pole	616	542	5,100	850	2,307	172	415	9		8,853	.88	14
		Stream	20	19	76	523		13	50			662	.95	33
	Third	Total	636	561	5,176	1,373	2,307	185	465	9		9,515	.88	15

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1930-1944
MOUNT RAINIER NATIONAL PARK

Working	Class	Gross Acres	Net Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
						Man-Days	Ribes
First	NP-Reg.	2,647	1,838	3,806	780,171	1.44	295
	NP-CCC	5,607	1,743	6,264	860,336	1.12	153
	Total	8,254	3,581	10,070	1,640,507	1.22	199
Second	NP-Reg.	766	766	569	19,395	.74	25
	NP-CCC	3,561	2,774	5,372	381,518	1.51	107
	Total	4,327	3,540	5,941	400,913	1.37	93
Third and Other	NP-Reg.	3,914	3,914	3,784	103,464	.97	26
	NP-CCC	1,792	1,572	1,056	51,313	.59	29
	Total	5,706	5,486	4,840	154,777	.85	27
All Workings	NP-Reg.	7,327	6,518	8,159	903,030	1.11	127
	NP-CCC	10,960	6,089	12,692	1,293,167	1.16	118
	Total	18,287	12,607	20,851	2,196,197	1.14	120

TABLE 5

SUMMARY OF RIBES ERADICATION, 1930-1944
MOUNT RAINIER NATIONAL PARK
(Net Control Area)

Working	Area	Eradication Type	Acres	Man-Days	Ribes Destroyed										Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes bracteatum	Ribes watsonianum	Ribes laxiflorum	Ribes acerifolium	Ribes sanguineum	Ribes triarte	Man-Days	Ribes			
First	Longmire	Reproduction	274	397	40,281		1,101		5,409	5,804			52,595	1.45	192		
		Stream	526	1,202	185,687		97,774		53,899	2,838	16		340,214	1.92	543		
		Total	900	1,599	225,968		98,875		59,308	8,642	16		392,809	1.78	436		
	White River	Reproduction	66	50	6,869	239		1,133	550	194			9,006	.76	136		
		Pole	1,870	2,087	173,780	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212		
		Mature	322	264	27,327	12,847			5	45			40,224	.82	125		
	Stream	423	744	162,856	1,510	4,869	242	8,820	188	98	8	178,591	1.76	422			
All Areas	Total	2,681	3,145	370,832	84,125	5,429	140,613	10,564	11,228	189	752	623,732	1.17	233			
	Reproduction	340	447	47,150	239	1,122	1,133	5,959	5,998			61,601	1.31	181			
	Pole	1,870	2,087	173,780	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212			
	Mature	322	264	27,327	12,847			5	45			40,224	.82	125			
Second	Longmire	Stream	1,049	1,946	348,543	1,510	102,643	242	62,719	3,026	114	8	518,805	1.86	495		
		Total	3,581	4,741	595,800	84,125	104,304	140,613	69,872	19,870	205	752	1,016,541	1.32	284		
		Reproduction	274	271	10,961		1,136		2,394	1,426	50		13,559	.99	49		
	White River	Stream	614	526	19,977		23,196		2,394	1,426	50		47,043	.86	77		
		Total	888	797	30,938		24,332		2,394	2,888	50		60,602	.90	68		
		Reproduction	66	12	221			77					298	.18	5		
	Stream	1,870	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.95	43			
Third and Other	All Areas	Mature	322	47	1,278	2,011							3,283	.15	10		
		Stream	394	657	32,748		154		5				32,907	1.67	84		
		Total	2,652	2,484	70,531	16,315	2,330	6,941	16,229	4,537			116,883	.94	44		
	Longmire	Reproduction	340	283	11,182		1,136	77		1,462			13,857	.83	41		
		Pole	1,870	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.95	43		
		Mature	322	47	1,278	2,011							3,289	.15	10		
	Stream	1,008	1,183	52,725		23,350		2,399	1,426	50		79,950	1.17	79			
All Workings	Longmire	Total	3,540	3,281	101,469	16,315	26,662	6,941	18,623	7,425	50		177,485	.93	50		
		Pole	563	1,364	17,804		1,753		259	15,582	9		35,407	2.42	63		
		Stream	794	1,190	41,312		12,833		1,429	551	6		56,131	1.50	71		
	White River	Total	1,357	2,554	59,116		14,586		1,688	16,133	15		91,538	1.68	67		
		Pole	3,274	1,456	1,650	3,196		12,822	20	5,184			22,872	.44	7		
		Stream	855	407	15,440	2,268	227		703	4			18,642	.48	22		
	Total	4,129	1,863	17,030	5,464	227	12,822	723	5,188			41,514	.45	10			
All Workings	Longmire	Pole	3,837	2,820	19,454	3,196	1,753	12,822	279	20,766	9		58,279	.73	15		
		Stream	1,649	1,597	56,752	2,268	13,060		2,132	555	6		74,773	.97	45		
		Total	5,486	4,417	76,206	5,464	14,813	12,822	2,411	21,321	15		133,052	.81	24		
	White River	Reproduction	548	668	51,242		2,237		5,409	7,266			66,154	1.22	121		
		Pole	563	1,364	17,804		1,753		259	15,582	9		36,407	2.42	63		
		Stream	2,034	2,918	246,976		133,803		57,722	4,815	72		443,388	1.43	218		
	Total	3,145	4,950	316,022		137,793		63,390	27,663	81		544,949	1.57	173			
All Workings	Longmire	Reproduction	132	62	7,090	239	21	1,210	550	194			9,304	.47	70		
		Pole	7,014	5,311	211,714	87,029	2,715	158,924	17,433	20,522	91	744	499,172	.76	71		
		Mature	644	311	28,605	14,858			5	45			43,513	.48	68		
	White River	Stream	1,672	1,808	211,044	3,778	5,250	242	9,528	192	98	8	230,140	1.08	138		
		Total	9,462	7,492	458,453	105,904	7,986	160,376	27,516	20,953	189	752	782,129	.79	83		
		Reproduction	680	730	58,332	239	2,258	1,210	5,959	7,460			75,458	1.07	111		
	All Areas	Pole	7,577	6,675	229,518	87,029	4,468	158,924	17,692	36,104	100	744	534,579	.88	71		
Mature		644	311	28,605	14,858			5	45			43,513	.48	68			
Stream		3,705	4,726	458,020	3,778	139,053	242	67,250	5,007	170	8	673,528	1.28	182			
Total	12,607	12,442	774,475	105,904	145,779	160,376	90,906	48,616	270	752	1,327,078	.99	105				

BLISTER RUST CONTROL, GLACIER NATIONAL PARK, 1944

By

M. C. Riley, Operation Supervisor

The blister rust control program on Glacier National Park during the 1944 field season was a continuation of that initiated in 1939. Work was started on June 2 and was completed on June 30, being confined to the Two Medicine area which was the only area needing attention at this time. Third working was performed on all stream type and second working was done on the slope north of the campground, on some of the area south of the lake and in patches south and east of the campground. This is located in unsurveyed sec. 36, T. 32 N., R. 14 W. and sec. 1, T. 31 N., R. 14 W., Montana Meridian. A total of 206 acres was covered.

Work was conducted with one field crew of approximately fifteen men from the Civilian Public Service camp. The performance of these assignees was more satisfactory than last year. It was not possible to perform a systematic check on the worked area but close inspection during the progress of the work indicated that satisfactory results were being obtained. No experienced blister rust foreman was available and it was necessary to train a new man for the position.

A representative of the Bureau of Entomology and Plant Quarantine helped plan and organize the work. Supervision was also supplied by a representative of the Bureau who remained on the work for practically the duration of the project. The Bureau also supplied the necessary maps, forms and office supplies for the proper recording and reporting of data. Funds from a regular National Park Service appropriation were used to employ a foreman and to cover incidental expenditures for supplies and equipment.

BLISTER RUST INFECTION

Blister rust infection on Pinus flexilis was found by C. M. Chapman in five scattered locations on the Two Medicine area. Five trees were infected with one canker on each tree. Only one of the cankers had fruited more than once, although all cankers were on 1934 or 1935 wood. This pine infection, probably of 1937 origin, is believed to be the first found east of the Continental Divide in the Northwest.

A reexamination of the infection at the head of Lake McDonald revealed a few more infected trees although those found did not extend the infected area. As was formerly found, there was only one canker per tree with one exception. No cankers were found which had originated since ribes eradication work had been started. A very small amount of infection was found on ribes which had resprouted since the last working.

After the close of the regular field season Park Service officials located infection on P. monticola in sec. 30, T. 32 N., R. 19W. This is outside of any blister rust control area.

CONTROL STATUS

On the four areas thus far selected for protection, the first working is completed and rework is being accomplished according to approved schedules. On all areas, each successive working involves fewer acres and less man-days. At Park Headquarters the proposed work for 1945 should be all that is necessary on this unit for at least five years. This is also true of the Lake McDonald area except for the stream type. At East Glacier at least two more workings will be necessary where first working was done in 1943, although one more working should suffice for the remainder of the area, except stream type. At Two Medicine it will probably be necessary to rework portions of the 1944 area once more and here also the stream type will require further attention.

RECOMMENDATIONS

For the orderly progress of the program the only urgent work for the 1945 season would be rework jobs at Lake McDonald and at Park Headquarters. It is estimated that this would require the services of twenty men in the field for two months. If sufficient supervision were available, rework could be done at East Glacier but since there is no known pine infection present, this work can be deferred until 1946.

Some consideration has been given by the Park Service to the inclusion of other areas in the control program. A decision should be made in the near future as to any additional areas in order that plans may be prepared and work initiated for their protection.

RESULTS

The following tables show statements of expenditures, results of the field work for 1944 and accumulative results for all work done to date. In the accumulative table it will be noted that eradication types "brush" and "subalpine" have been combined as "miscellaneous".

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1944
GLACIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$607.75
National Park Service	Regular BLR-5	359.48
Total		\$967.23

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1944
GLACIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	BLR-5	
Sal. perm. men	\$516.03	\$240.95	\$756.98
Travel and transp.	91.72		91.72
Supplies and material		54.21	54.21
Subsistence		64.32	64.32
Total	\$607.75	\$359.48	\$967.23

TABLE 3

SUMMARY OF RIBES ERADICATION, 1944
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme		Man-Days	Ribes
Two Medicine	Second	Pole	162	88	4,398	1,082	4,562	216	10,258	.54	63
	Third	Stream	44	116	11,230	32		12,456	23,718	2.64	539
	All Workings	All Types	206	204	15,628	1,114	4,562	12,672	33,976	.99	165

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1939-1944
GLACIER NATIONAL PARK

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
First	NP-Reg.	262	301	37,155	1.15	142
	NP-CCC	2,633	2,833	323,841	1.08	123
	NP-CPS	302	771	103,559	2.55	343
	Total	3,197	3,905	464,555	1.22	145
Second	NP-Reg.	731	763	122,606	1.04	168
	NP-CPS	248	288	45,344	1.16	183
	Total	979	1,051	167,950	1.07	172
Third	NP-CPS	44	116	23,718	2.64	539
All Workings	NP-Reg.	993	1,064	159,761	1.07	161
	NP-CCC	2,633	2,833	323,841	1.08	123
	NP-CPS	594	1,175	172,621	1.98	291
	Total	4,220	5,072	656,223	1.20	156

TABLE 5

SUMMARY OF RIBES ERADICATION, 1939-1944
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme		Man-Days	Ribes
Park Headquarters	First	Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
		Pole	284	122	13,428	15,364	8,967		37,759	.43	133
		Miscellaneous	39	119	9,411	21,340	8,353		39,104	3.05	1,003
		All Types	681	445	32,708	43,176	32,986		108,870	.65	160
	Second	Reproduction	134	39	2,876	581	558		4,015	.29	30
		Pole	127	79	376	964	535		1,875	.62	15
		Miscellaneous	39	52	13	973	67	2	1,055	1.33	27
		All Types	300	170	3,265	2,518	1,160	2	6,945	.57	23
	All Workings	Reproduction	492	243	12,745	7,053	16,224		36,022	.49	73
		Pole	411	201	13,804	16,328	9,502		39,634	.49	96
		Miscellaneous	78	171	9,424	22,313	8,420	2	40,159	2.19	515
		All Types	981	615	35,973	45,694	34,146	2	115,815	.63	118
Two Medicine	First	Pole	593	645	40,145	2,705	1,723	8,646	53,219	1.09	90
		Miscellaneous	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
		Stream	54	480	30,429	438		12,592	43,459	8.89	805
		All Types	707	1,243	74,509	4,193	6,388	23,072	108,162	1.76	153
	Second	Pole	252	181	15,716	1,332	4,562	5,874	27,484	.72	109
		Miscellaneous	16	20	1,495	67		2,471	4,033	1.25	252
		Stream	32	156	46,233	14		25,259	71,506	4.68	2,235
		All Types	300	357	63,444	1,413	4,562	33,604	103,023	1.19	343
	Third	Stream	44	116	11,230	32		12,456	23,718	2.64	539
		All Types	44	116	11,230	32		12,456	23,718	2.64	539
	All Workings	Pole	845	826	55,861	4,037	6,285	14,520	80,703	.98	96
		Miscellaneous	76	138	5,430	1,117	4,665	4,305	15,517	1.82	204
		Stream	130	752	87,892	484		50,307	138,683	5.78	1,067
		All Types	1,051	1,716	149,183	5,638	10,950	69,132	234,903	1.63	224
Lake McDonald	First	Mature	1,410	913	21,077	4,253	34,175		59,505	.65	42
		Stream	11	39	5,184	35	1,602		6,821	3.55	620
		All Types	1,421	952	26,261	4,288	35,777		66,326	.67	47
		Mature	282	303	3,173	1,305	15,996		20,474	1.07	73
	Second	Stream	11	21	998	130	1,294		2,422	1.91	220
		All Types	293	324	4,171	1,435	17,290		22,896	1.11	78
		Mature	1,692	1,216	24,250	5,558	50,171		79,979	.72	47
		Stream	22	60	6,182	165	2,896		9,243	2.73	420
		All Types	1,714	1,276	30,432	5,723	53,067		89,222	.74	52
	All Workings	Pole	367	1,005	44,305	14,739	11,042	65,936	136,022	2.74	371
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	388	1,265	44,376	14,897	11,042	110,882	181,197	3.26	467
East Glacier	First	Pole	86	200	21,816	2,492	9,507	1,271	35,086	2.33	408
		Mature	453	1,205	66,121	17,231	20,549	67,207	171,108	2.66	378
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	474	1,465	66,192	17,389	20,549	112,153	216,283	3.09	456
	Second	Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
		Pole	1,244	1,772	97,878	32,808	21,732	74,582	227,000	1.42	182
		Mature	1,410	913	21,077	4,253	34,175		59,505	.65	42
		Miscellaneous	99	237	13,346	22,390	13,018	1,834	50,588	2.39	511
		Stream	86	779	35,684	631	1,602	57,538	95,455	9.06	1,110
		All Types	3,197	3,905	177,854	66,554	86,193	133,954	464,555	1.22	145
	Third	Reproduction	134	39	2,876	581	558		4,015	.29	30
		Pole	465	460	37,908	4,788	14,604	7,145	64,445	.99	139
		Mature	282	303	3,173	1,305	15,996		20,474	1.07	73
		Miscellaneous	55	72	1,508	1,040	67	2,473	5,088	1.31	93
All Areas	First	Stream	43	177	47,231	144	1,294	25,259	73,928	4.12	1,719
		All Types	979	1,051	92,696	7,858	32,519	34,877	167,950	1.07	172
	Second	Stream	44	116	11,230	32		12,456	23,718	2.64	539
		All Types	44	116	11,230	32		12,456	23,718	2.64	539
	All Workings	Reproduction	492	243	12,745	7,053	16,224		36,022	.49	73
		Pole	1,709	2,232	135,786	37,596	36,336	81,727	291,445	1.31	171
		Mature	1,692	1,216	24,250	5,558	50,171		79,979	.72	47
		Miscellaneous	154	309	14,854	23,430	13,085	4,307	55,676	2.01	362
		Stream	173	1,072	94,145	807	2,896	95,253	193,101	6.20	1,116
		All Types	4,220	5,072	281,780	74,444	118,712	181,287	656,223	1.20	156

PROGRESS OF RIBES ECOLOGY WORK AND DEVELOPMENTAL WORK IN METHODS OF
RIBES ERADICATION IN THE NORTHWESTERN REGION FOR 1944

By

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and

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FOREWORD

Activities of the developmental and improvement project BLR-1-6 for the calendar year of 1944 have included office, laboratory, greenhouse and field work. The present annual report, as in past years, is primarily a report on field work. Only a brief statement (Section III of this report) is given of activities other than field work. Section II presents details of the plot data secured during 1944 and Section I is a status report on the various field jobs in ecology and methods improvement currently in progress. Attention should be called to new work started this year in the establishment of mil-acre plots in Latin Square design for the purpose of correlating ribes regeneration and age of cutting of timber. Data from these plots should assist in the broader phases of planning control work in relation to timber management practices. Disease study work in relation to effectiveness of control continued as an activity of this project during 1944. Principal jobs completed on disease study included a sample check of the white pine on the Powder House plot, Clearwater Forest and establishment of a new field plot at Hanna Road, Kaniksu National Forest, to study the effectiveness of control associated with a small residual population of Ribes lacustre on a 3 to 4 year interval between workings. To permit full attention to the compilation of data which have been accumulated over a period of years, no annual report will be submitted this year on disease study work.

I. SUMMARY

A. Grazing of Sheep on Cutover Lands in Relation to the Regeneration and Growth of Ribes and Western White Pine

1. Status of work. Four studies are in progress on problems relating to grazing of sheep and control of the rust on cutover lands in the white pine type, namely: (a) Effects of normal grazing of recent cutover lands on the germination, growth and development of ribes and western white pine seedlings, (b) Effects of deferred grazing on seedlings, (c) Effects of controlled grazing on seedlings, and (d) Effects of continuous seasonal grazing of old logged and burned-over lands on the regeneration of ribes and western white pine seedlings. Discussions are given for (a) and (b) problems in the section on field work. Ribes have been removed from all study areas except (c), a project carried on in cooperation with the School of Forestry, University of Idaho, and the Potlatch Timber Protective Association.

(a) Five exclosures with accompanying controls were established during the years 1939 and 1940 to study the effects of grazing

recent cutover lands on the germination and subsequent growth of ribes and western white pine seedlings. Three of these plots are located on the Clearwater and two on the St. Joe Forests. With 5 years of study now completed the following conclusions have been reached:

- (1) Average production of live stem is greater for ribes subjected to grazing. Cropping of terminal shoots results in the formation of more main stems and an increased number of leaf-bearing lateral branches arising from adventitious buds. Concomitant with increased production of live stem is a larger number of leaves for ribes subjected to grazing.
 - (2) Average height of ribes bush is greater when subjected to grazing. Significant is the fact that fewer ribes under 6 inches in height are to be found on the grazed areas from the second or third growing seasons on. It follows then that a higher percentage of the bushes attain a greater height on grazed areas making possible increased efficiency in ribes eradication.
 - (3) Grazing was not found responsible for increasing the problem in ribes regeneration on the open range over that which occurs normally. More ribes seedlings were found germinating and surviving on ungrazed area than on the recent cutover land subjected to grazing.
 - (4) Germination of white pine seed is considerably greater on areas subjected to grazing. Loss of seedlings from trampling and browsing is uncommon on the open range.
- (b) The deferment of grazing from cutover lands which have been under range use by sheep for some 5 or 6 years does not create a more favorable condition for increased efficiency in ribes eradication by comparison with lands under continued use. Two exclosures and accompanying controls were established in 1940 on the Clearwater Forest from which these conclusions are drawn:

- (1) Ribes seeds have continued to germinate over a longer period following cutting of mature timber on the areas deferred from range use.
- (2) Growth or production of live stem has varied but little between bushes on area deferred and under continued grazing. Height of ribes bush has been slightly greater on area deferred from grazing. Number of main stems, lateral branches, total live stem and number of leaves have been greater for bushes under continued grazing.

(3) Although the average height per bush is greater on areas deferred from grazing such areas from the fourth year on of deferment, have a higher percentage of total bushes less than 6 inches in height. Density of associated vegetation was found considerably higher on area deferred from grazing which makes more difficult the job of searching for small ribes.

(c) The effects of controlling the intensity of grazing on cutover lands have shown overgrazing on slopes greater than about 40 percent often is responsible for germination of ribes seed and rather severe loss of pine seedlings. Moderate grazing at the rate of 21 acres per animal unit has no material effect upon the problem of ribes regeneration or loss of pine seedlings. Seedlings of grand fir Abies grandis and common Douglas fir Pseudotsuga taxifolia succumb in large numbers from trampling by sheep.

(d) The effects of grazing sheep year after year on old logged and burned-over areas that have become sodded to varying degrees have no importance relative to the problem of ribes regeneration. The sod is broken sufficiently however to be encouraging for the germination of white pine seed. Stocking of white pine on these areas is noticeably increasing as a result of continued grazing.

B. Ecological Studies of Ribes and Western White Pine

1. Status of work. Investigations were continued the past season on the following studies: (a) The effects of variable light and moisture conditions on the germination, growth and development of Ribes lacustre, R. viscosissimum and Pinus monticola, (b) Stand improvement practices in relation to the ecological development of ribes, (c) Slash disposal measures in relation to the regeneration and development of ribes and white pine seedlings, (d) Direct seeding of western white pine, (e) Ribes regeneration key for the western white pine region, and (f) Observations on the resprouting habits of R. lacustre. In addition a study was started to determine "Longevity of ribes seeds as affected by change of environmental conditions resulting from cutting of mature timber."

(a) The study of variable light and moisture conditions in relation to the germination, growth and development of ribes and western white pine seedlings was established under conditions of full sun, half shade and full shade light intensities. At each of these light stations seeds of ribes and white pine were sown on natural duff, mineral and burned-mineral soil surfaces. In addition to the conclusions given in the 1943 annual report the following facts can be added:

(1) Disturbance of the three types of soil surfaces resulted in increased germination of ribes seeds over the undisturbed controls.

(2) Germination of ribes seeds on both the disturbed and undisturbed soil surfaces increased toward full shade conditions of low soil temperature and minimum variation of soil moisture. Thus the length of time ribes seeds will remain viable for germination is dependent upon soil moisture and soil temperature conditions.

(3) Seed of R. lacustre germinates more readily under all conditions of environment than does seed of R. viscosissimum. R. lacustre seed will thus represent the greater regenerative hazard of the two species following minor disturbances by ribes eradication, erosion, wild life and blow-downs.

(b) Ribes ecological studies which relate to stand improvement practices for the western white pine type are being continued in cooperation with Timber Management and the Northern Rocky Mountain Forest and Range Experiment Station. In addition to the maintenance of these studies considerable time is being devoted to field conferences for the close coordination of timber management practices with the rust control program. Seven timber management conferences were attended this past season and two relating to fuel reduction. Fuel reduction work will become an important factor in aiding control of the rust. The advantages of fuel reduction as relating to control of the rust and management of white pine are as follows:

(1) Areas of hazardous fuels in the white pine type will be reduced by control burning. Burning will be followed by planting of white pine on favorable sites.

(2) Burning will establish conditions favorable for the total suppression of ribes at low acreage costs on areas now excluded from the control units because of fire risks, and difficult eradication conditions will make possible the inclusion of such areas upon planting of white pine.

(3) On good white pine sites now included in the control units but deferred from work because of low stocking, burning and planting will reduce period of maturity by some 40 years with maximum volume returns.

(4) Fuel reduction will remove many sources of heavy ribes concentrations now responsible for long distance spread of the rust. Many areas of pine now lost from the rust can likewise be burned and rehabilitated by planting.

(c) Studies of slash disposal measures in the western white pine type are being carried on in cooperation with the Forest Service, Potlatch Forests, Inc., and the Slash Disposal Committee of the Inland Empire Section of the Society of American Foresters. Continued observations are being made on the experimental areas of partial and complete disposal of slash on the Clearwater and St. Joe Forests. Partial disposal measures are materially reducing the ribes regeneration problem on newly cutover areas. Probably of greatest importance is the limited distribution of ribes over the areas as a result of partial disposal. The bushes are found almost entirely along skid trails and firebreaks leaving considerable area free of ribes where previously extensive burning of slash piles under the method of complete disposal resulted in larger numbers of seedlings distributed more widely over the area. This limited distribution and numbers of ribes resulting from partial disposal of slash not only makes the job of ribes eradication less difficult but does much to set ribes apart from the bulk of new pine seedlings coming in on undisturbed ground.

(d) Studies in direct seeding of western white pine were continued and extended in scope during the past season on the Kaniksu and St. Joe Forests. Encouraging results are being obtained in germination by first cracking the seed coat, stratifying for about 2 months in cold storage and broadcast sowing in the spring when soil temperatures become favorable for immediate germination. Seed germinates and starts growth in a relatively short time thus seed-eating rodents have but a few days to consume much of the ungerminated seed. Work is now underway toward the development of a mechanical seed-coat cracker. As white pine produced appreciably no cone crop in 1944 further field work will not be undertaken until new seed can be obtained.

(e) Additional work was done this past season on the revision of the ribes regeneration key. It was found necessary to re-weight some of the factors found applicable in the determination of potential ribes regeneration problems. The key has served a valuable purpose if for no other reason than making known a systematic method for the determination of potential areas of ribes likely to originate from stored seed. The key was used to particular advantage in the determination of potential ribes populations on the Fishhook Timber Sale Area in the St. Joe National Forest. The key plus collection of soil samples for the extraction of ribes seeds provided a good cross check. Keying to determine potential ribes populations resulted in findings substantiated by the extraction of seed from soil samples. Many of these determinations will be made for Timber Management before cutting practices have been adopted in order that the ecology of ribes can be given

due consideration in a plan of sustained management.

(f) Further observations were made of the R. lacustre bushes decapitated in 1942 to study habits of resprouting. Given in the 1943 annual report are final results of this study with the exception of knowledge on roots retaining healthy tissue without resprouting by the end of the 1943 growing season. No severed roots in the above status were found resprouting in 1944. Since resprouting is dependent upon adequate reserves of stored food for the formation and growth of adventitious buds arising solely from crown tissue there is little reason to suspect much delay in the occurrence of new aerial shoots. Large roots of old bushes, however, might effectively resprout after a delay of one or more growing seasons because of the greater capacity for stored foods. To establish this point, and because the 1942 treatments were of R. lacustre bushes 4 to 6 years of age, the study will be duplicated on older bushes having larger roots.

(g) One of the principal problems in the region relates to the number of years ribes seeds will remain viable for germination in the organic soil mantle undisturbed by the logging operations. Studies have shown that when ribes seeds are stored beneath the organic mantle under a minimum of environmental variation, they remain viable for a period equal to or greater than the life of a timber stand. When this environment is altered by cutting practices ribes seeds become exposed to conditions favorable for germination. The number of seeds germinating is dependent upon the degree of disturbance or soil aeration, and the establishment of optimum soil temperature and soil moisture conditions. As logging does not result in a complete disturbance of the forest floor, a considerable quantity of ribes seeds remain undisturbed and ungerminated beneath the organic soil mantle. The altered conditions of environment brought about by cutting of mature stands are not conducive to a lengthy storage period of ribes seeds because of soil aeration and the variations of soil temperature and soil moisture. The number of years ribes seeds will continue to remain viable after cutting has altered the environment of storage is not known. Field observations have indicated that the percentage of viable ribes seeds gradually decreases each year following logging, and after some 15 to 20 years have elapsed, only a small amount of this old seed is capable of germination upon disturbance of the forest floor. Plots were established this past season on the Kaniksu, Coeur d'Alene and St. Joe Forests to study this question in detail.

C. Tests of Ammonium Sulfamate for Ribes Eradication.

1. Status of Work. In Idaho, field work in the testing of ammonium

sulfamate for ribes eradication was started in September 1943 when aqueous sprays were applied to stream-type R. lacustre along Crystal Creek, St. Joe National Forest. In early season, mid-season, and late season of 1944 sulfamate sprays were applied to R. lacustre in the Crystal Creek area. Also, in June and again in September 1944 sulfamate sprays were tested on R. viscosissimum and upland-type R. lacustre near the head of LaClerc Creek, Kaniksu National Forest.

Results to date indicate that aqueous ammonium sulfamate applied as a spray and soil drench to stream-type R. lacustre at the rate of 1 pound and 2 gallons should provide close to 100 percent kill of bushes. In terms of dosage, this is about the same as the recommended dosage for the practical eradication of R. petiolare. At present, however, the cost of ammonium sulfamate is about twice that of Atlacide so that the total cost (labor and chemical) of eradicating stream-type R. lacustre by sulfamate would be about 30 percent more than previous chemical spray work on R. petiolare. There is some possibility that the practical lethal dosage of ammonium sulfamate on stream-type R. lacustre may be less than one pound per milacre. No conclusions are yet available from the tests on R. viscosissimum and upland R. lacustre.

II. FIELD WORK

A. Grazing of Sheep on Cutover Lands in Relation to the Regeneration and Growth of Ribes and Western White Pine.

Effects of Grazing Recent Cutover Lands on the Germination, Growth and Development of Ribes and Western White Pine Seedlings.

Previous discussions of this study are given in the 1939 to 1943 annual reports. Final summaries upon completion of 5 years study of growth characteristics between grazed and ungrazed ribes are presented in the 1943 annual report. Grazing was found to have caused a significant increase in the total footage of live stem and the number of leaves per ribes bush. Responsible for this were the formation of more main stems and an increased number of lateral branches arising from adventitious buds upon cropping of terminal shoots. Cropping of ribes results in a similar injury to that of pruning fruit trees with subsequent increased production of new wood. To correlate grazing in relation to the efficiency of ribes eradication bushes on the ungrazed and grazed areas of plots 1 and 2 have been grouped into three height classes. The first class of 6 inches or less in height represents a size of ribes bush most difficult to find. Less than 75 percent of bushes in this height class are normally recovered. The second class of 6.1 to 12 inches in height is an intermediate size of bush of which 75 percent or more should be found. The third class of 12.1 inches or over in height represents a size of which better than 90 percent should be found by the eradication crews. The total number of ribes and the percent of bushes in each size class by years are shown in table 1.

TABLE 1

TOTAL NUMBER OF RIBES BY YEAR AND PERCENT OF TOTAL BUSHES
IN EACH OF THE THREE HEIGHT CLASSES FOR PLOTS 1 AND 2
IN THE CLEARWATER FOREST

Year	Status of Area in Respect to Grazing							
	Ungrazed				Grazed			
	Total No. Ribes	Percent of total bushes in height class			Total No. Ribes	Percent of total bushes in height class		
		Under 6"	6.1-12"	Over 12.1"		Under 6"	6.1-12"	Over 12.1"
PLOT 1 - NORTH EXPOSURE								
1939	76	94.7	5.3	0	92	84.8	12.0	3.2
1940	79	79.7	16.5	3.8	93	55.9	30.1	14.0
1941	77	51.9	24.7	23.4	89	31.5	29.2	39.3
1942	73	43.8	12.4	43.8	88	19.3	23.9	56.8
1943	72	34.7	16.7	48.6	85	9.4	24.7	65.9
PLOT 2 - SOUTH EXPOSURE								
1939	39	82.0	15.4	2.6	17	82.4	11.8	5.8
1940	40	57.5	35.0	7.5	17	35.3	41.2	23.5
1941	34	41.2	35.3	23.5	15	26.7	46.7	26.6
1942	37	32.4	40.5	27.1	15	20.0	40.0	40.0
1943	35	29.6	25.7	45.7	15	6.7	26.7	66.6

Of significant importance is the shift of height classes of ribes between ungrazed and grazed area. Considering the year 1940 as the earliest possible date of initial ribes eradication (this being the third growing season after the 1937 out) 79.7 percent of the ribes on the ungrazed area of plot 1 were under 6 inches in height as compared to 55.9 percent on the grazed area. Eradication crews have been found to remove on the average better than 75 percent of all bushes over 6 inches in height and better than 90 percent of all bushes over 12 inches in height. With these efficiencies in mind important differences in height classes of ribes between grazed and ungrazed area can be observed in table 1. An important advantage for increased efficiency in ribes eradication is apparent for grazing of sheep on recent cut-over lands with the greater number of ribes falling into the larger height classes. Three physiological differences seem apparent for the height class advantage of ribes on grazed over ungrazed area. One is the lessened competition for ribes resulting from a lower density of associated vegetation. Another results directly from cropping of terminal shoots causing increased development of roots and the potential storage of food for new and more rapid growth. The third concerns the apparent stimulus for growth in soil aeration or cultivation from trampling and the added nutritional value from sheep dung.

The regeneration of ribes seedlings was found to continue over a greater number of years on ungrazed ground following the 1937 cutting of mature than on the areas subjected to grazing (table 2). Upon termination of period in which maximum germination of ribes seeds occur following a logging disturbance rodents were found responsible for nearly all additional ribes seedlings originating on the ungrazed exclosures. Ribes seeds are brought to the surface of the forest floor in the soil deposits raised by burrowing rodents. These mounds of fresh mineral soil present ideal germinating beds for newly exposed seed which has been many years in storage beneath the humus layer. On the areas being seasonably grazed these soil mounds of burrowing rodents are largely dispersed by the trampling of sheep. Seldom found on the open range therefore are ribes seedlings originating from rodent mounds because exposed seed becomes scattered to duff or other organic surfaces unfavorable for germination. Agitation of the duff surface by the trampling hoofs of sheep work exposed seed into the lower organic zone where germination seldom results. The few seedlings which have been observed germinating on rodent burrowings have been root-loosened in time and trampled out. Grazing of sheep on cutover lands following cutting does not add to the regenerative problem of ribes which normally follows a major disturbance from cutting. Ribes seedlings originating from a disturbance caused by grazing as in the case of heavy scarification on driveways or on bedding ground, and trailing on extreme slopes are usually offset in numbers by the mortality from trampling and browsing.

TABLE 2

NUMBER AND YEAR OF ORIGIN OF RIBES AND WESTERN
WHITE PINE SEEDLINGS ON RECENT CUTOVER LANDS
OF PLOTS 1 AND 2 IN THE CLEARWATER FOREST

Year of Origin	No. Ribes		No. White Pine	
	Ungrazed	Grazed	Ungrazed	Grazed
PLOT 1 - NORTHERN EXPOSURE				
1939	73	92	247	230
1940	11	2	21	21
1941	2	0	4	4
1942	0	0	7	6
1943	1	0	10	18
1944	0	0	17	67
TOTAL	87	94	306	346
PLOT 2 - SOUTHERN EXPOSURE				
1939	43	17	71	67
1940	1	0	3	14
1941	2	0	3	5
1942	0	0	3	9
1943	0	0	2	9
1944	0	0	6	36
TOTAL	46	17	88	140

Table 2 shows the comparative numbers and year of origin of ribes and white pine seedlings on the grazed and ungrazed areas of plots 1 and 2. The bulk of ribes seeds germinated within two growing seasons following cutting and the disposal of slash. Mature timber was cut during the winter months of 1937 and slash disposed of during the fall of 1938. Ribes seedlings germinating in 1939 originated prior to initial grazing in late September of the same year. The 1940 seedlings of both ribes and pine are therefore the first to be considered in relation to possible origin from the grazing disturbance. Only two ribes seedlings have appeared on the grazed portions of plots 1 and 2 since beginning of the study as against 17 seedlings on the ungrazed enclosures. Care should be exercised in attaching significance to the presence of dwarfed ribes bushes and new seedlings on overgrazed areas and in applying such observations to average conditions on the open range under regulatory management. There is of course little excuse for overgrazing but where such does occur on managed allotments the abusive condition seldom if ever represents more than a small fraction of the total acreage in the grazing unit. Consistently used bedding grounds and driveways require special consideration in the eradication of ribes as does stream type with its permanency of ribes habitat.

The total number of white pine seedlings germinating has been greater on the grazed areas of both plots 1 and 2. Data on the mortality of seedlings which

have not changed materially are shown in Table 5 of the 1943 annual report. The only good seed year since the plots were established occurred in 1943. This crop was responsible for a noticeable increase of seedlings germinating in 1944. The increase is noteworthy on the grazed areas of both plots 1 and 2. Moderate scarification of the soil surface by trampling of sheep each season as they move over the areas creates a favorable medium for germination of pine seed. This condition is also favorable for the establishment of seedlings.

Effects of Deferred Grazing on the Germination, Growth and Development of Ribes and Western White Pine Seedlings

The purpose of this study was to determine whether increased growth of small bushes would permit the establishment of adequate control standards upon deferment of grazing on cutover lands. In addition a measure of vegetative cover is being made to determine the influence of deferred versus continued grazing upon searching conditions for the eradication of ribes. The study was established upon lands from which mature timber had been cut in 1934, grazed each year thereafter and eradicated of ribes for the first time in 1939. The plots were established in 1940 on area where sufficient small ribes could be found after the 1939 eradication. Previous discussions of this study have been made in the 1940, 1941 and 1942 annual reports. Reported herein are final summary tables for ribes regeneration, growth and visibility studies on areas deferred and under continued seasonal grazing for plots 6 and 7 in the Clearwater Forest.

TABLE 3

NUMBER, YEAR ORIGIN AND MORTALITY BY YEAR ORIGIN OF RIBES
UPON COMPLETION OF 5 YEARS' STUDY OF DEFERRED AND CONTINUED
GRAZING OF PLOTS 6 AND 7 IN THE CLEARWATER FOREST

Year of Origin of Ribes	Plot 6 - North Exposure						Plot 7 - South Exposure					
	Status of Plot Area in Respect to Grazing											
	Deferred			Continued			Deferred			Continued		
	Alive	Dead	Total	Alive	Dead	Total	Alive	Dead	Total	Alive	Dead	Total
1935-												
1939	41	5	46	39	4	43	36	6	42	32	10	42
1940	24	6	30	2	1	3	2	0	2	4	2	6
1941	19	3	22	4	1	5	4	0	4	3	0	3
1942	2	0	2	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	2	2	4	0	0	0
1944	1	0	1	0	0	0	0	0	0	0	0	0
Total	87	14	101	45	6	51	44	8	52	39	12	51

Germination of stored ribes seed has continued over a longer period of years following the 1934 cutting operation on the deferred areas of plots 6 and 7 than on the ground subjected to continued seasonal grazing. Significant differences in number of ribes seedlings originating since establishment of the study in 1940 occur only for plot 6 on a north exposure. Responsible for continued regeneration of ribes seedlings on both deferred and grazed areas have been largely soil-burrowing rodents. Nearly all the 30 new seedlings in 1940 and the 22 seedlings in 1941 originating on the deferred area of plot 6 germinated close together where many bushes had been removed by eradication in 1939 and burrowing rodents were working. Two ribes seedlings on the grazed area of plot 6 originated directly as a result of excessive trailing across one corner of the plot. No evidence was found in the 5 years of study indicating that the grazing of sheep on cutover lands is in any way responsible for an increased problem in ribes regeneration over that which occurs normally following a logging disturbance. Ribes will originate from disturbances caused by grazing but grazing is also a cause of mortality of equal or greater numbers of ribes than are found germinating. Abusive use of the range as excessive trailing on steep slopes and heavy scarification of the forest floor from trailing along driveways and trampling of bedding grounds may cause regeneration of new ribes seedlings. Fortunately such abusive conditions are not common occurrences on open range under an animal quota allotment.

TABLE 4

COMPARISON OF AVERAGE GROWTH DIFFERENCES PER BUSH
OF RIBES ON DEFERRED AND GRAZED AREAS
OF PLOTS 6 AND 7 IN THE CLEARWATER FOREST

Year Data	No. Ribes	Averages Per Bush								
		Main Stems		Laterals		Feet of Live Stem			Bu. Ht. Ft.	No. Leaves
		No.	F.L.S.	No.	F.L.S.	Old	New	Total		
Plot 6 - Deferred Grazing										
1940	46	1.02	.42	1.23	.29	.36	.35	.71	.34	9.65
1941	44	1.09	.86	3.06	.46	.71	.61	1.32	.86	17.41
1942	43	1.14	1.22	5.14	.98	1.32	.88	2.20	1.22	30.16
1943	41	1.17	1.96	6.23	1.58	2.20	1.34	3.54	1.78	39.53
1944	41	1.23	2.98	8.10	2.34	3.54	1.78	5.32	2.24	52.08
Plot 6 - Continued Grazing										
1940	43	1.07	.45	1.43	.33	.41	.37	.78	.39	12.59
1941	41	1.21	.81	4.22	.66	.78	.69	1.47	.79	25.22
1942	41	1.57	1.13	8.56	1.55	1.47	1.21	2.68	1.03	38.40
1943	40	1.84	1.38	13.07	2.64	2.68	1.34	4.02	1.69	53.78
1944	39	1.92	2.03	17.42	3.71	4.02	1.72	5.74	1.94	71.23
Plot 7 - Deferred Grazing										
1940	41	1.07	.56	2.15	.38	.53	.41	.94	.54	15.34
1941	39	1.12	.86	2.30	.46	.94	.38	1.32	.81	26.38
1942	38	1.18	1.13	4.03	.92	1.32	.73	2.05	1.19	34.83
1943	36	1.21	1.87	5.42	1.34	2.05	1.16	3.21	1.64	42.60
1944	36	1.27	2.37	7.96	1.96	3.21	1.12	4.33	2.02	55.16
Plot 7 - Continued Grazing										
1940	42	1.04	.49	1.93	.36	.48	.37	.85	.47	13.77
1941	37	1.09	.80	3.16	.73	.85	.68	1.53	.78	32.51
1942	34	1.25	.96	5.84	1.22	1.53	.65	2.18	1.14	41.08
1943	33	1.41	1.48	9.33	1.96	2.18	1.26	3.44	1.58	55.62
1944	32	1.67	2.02	16.10	2.84	3.44	1.42	4.86	1.87	67.34

Table 4 shows the comparative growth habits of ribes on deferred as against area under continuous grazing since logging in 1934.

In 1944 growth differences of ribes upon completion of 5 years' study of plot 6 on a north exposure are as follows: Number of main stems or shoots 1.23 with 2.98 feet of live stem as against 1.92 with 2.03 feet of live stem per bush. Number of lateral branches are 8.10 with 2.34 feet of live stem as against 17.42 laterals with 3.71 feet of live stem. Grazing of terminal shoots is responsible for the development of many lateral branches arising from adventitious buds. The footage of old live stem per ribes in the enclosure is 3.54 as against 4.02; new or current year's live stem 1.78 and 1.72 with totals of 5.32 as against 5.74. Average height of bush on area deferred

of grazing is 2.24 as against 1.94 on the ground subjected to grazing. Number of leaves per bush for ribes in the exclosure is 52.08 as against 71.23 for ribes subjected to grazing. Here again is a striking difference in plant structure caused by browsing of terminal shoots resulting in the formation of many more leaf-bearing lateral branches arising from adventitious buds. About the only difference in growth of ribes unexposed to grazing is the slight margin in height of bush over those subjected to grazing. The importance of this margin will be discussed later in relation to grouping of ribes by height classes.

Average growth differences of ribes on area deferred as against continued grazing for plot 7 on a south exposure are as follows: Number of main stems or shoots 1.27 with 2.37 feet of live stem as against 1.67 with 2.02 feet of live stem. Number of lateral branches per bush for ribes on deferred area is 7.96 with 1.96 feet of live stem and 16.10 laterals per bush with 2.84 feet of live stem on the area subjected to grazing. The footage of old live stem per ribes bush in the exclosure is 3.21 as against 3.44; new or current year's live stem 1.12 and 1.42 with totals of 4.33 and 4.86. Average height of bush on deferred area is 2.02 feet as against 1.87 on area subjected to continued grazing. Number of leaves per bush are 55.16 for ribes on deferred area as against 67.34 for ribes on grazed area.

TABLE 5

TOTAL NUMBER AND PERCENT OF TOTAL RIBES ORIGINATING PRIOR TO 1940
IN EACH HEIGHT CLASS FOR PLOTS 6 AND 7 IN THE CLEARWATER FOREST

Year	Status of Plot Area in Respect to Grazing							
	Deferred				Continued			
	Total No. Ribes	Percent of total bushes by height class			Total No. Ribes	Percent of total bushes by height class		
		Under 6"	6.1"-12"	Over 12.1"		Under 6"	6.1"-12"	Over 12.1"
Plot 6 - Northern Exposure								
1940	46	26.1	67.4	6.5	43	25.6	69.8	4.6
1941	44	22.7	61.4	15.9	41	22.0	63.4	14.6
1942	43	16.3	39.5	44.2	41	14.6	48.8	36.6
1943	41	12.2	29.3	58.5	40	7.5	40.0	52.5
1944	41	9.8	17.0	73.2	39	5.1	28.2	66.7
Plot 7 - Southern Exposure								
1940	41	22.0	68.3	9.7	42	26.2	61.9	11.9
1941	39	20.5	61.5	18.0	37	21.6	54.1	24.3
1942	38	15.8	36.8	47.4	34	14.7	44.1	41.2
1943	36	16.7	22.2	61.1	33	9.1	33.3	57.6
1944	36	13.9	16.7	69.4	32	9.4	25.0	65.6

To correlate grazing in relation to the efficiency of ribes eradication, ribes data on the areas deferred and under continuous seasonal grazing have been grouped into three height classes. These ribes are those which originated during the years 1935 to 1939 and remained after the initial working in 1939. With a total of 46 ribes on the deferred area of plot 6 in 1940, 26.1 percent were under 6 inches in height, 67.4 from 6.1 to 12 inches in height and 6.5 over 12.1 inches in height. In 1944 after the completion of the fifth year's growth of ribes on area deferred from grazing 9.8 percent remained under 6 inches in height, 17.0 percent from 6.1 to 12 inches and 73.2 percent were over 12.1 inches in height. On the area under continuous seasonal grazing since logging there were 25.6 percent of the bushes under 6 inches in height in 1940, 69.8 percent from 6.1 to 12 inches and 4.6 percent over 12.1 inches in height. With five additional years of grazing there were present in 1944, 5.1 percent of the 39 bushes still under 6 inches in height, 28.2 percent from 6.1 to 12 inches and 66.7 percent over 12.1 inches in height.

Plot 7 on a southern exposure had in 1940 a total of 41 ribes on the area deferred of grazing and 42 ribes on the area under continuous grazing. On the deferred area 22.0 percent of the 41 ribes were under 6 inches in height, 68.3 percent from 6.1 to 12 inches and 9.7 percent over 12.1 inches in height. On the area under continuous seasonal grazing there were 26.2 percent of the bushes in 1940 under 6 inches in height, 61.9 percent from 6.1 to 12 inches and 11.9 percent over 12.1 inches in height. In 1944 upon completion of 5

years of study there remained on the deferred area 13.9 percent of the ribes bushes under 6 inches in height, 16.7 percent from 6.1 to 12 inches and 69.4 percent of the bushes over 12.1 inches in height. In contrast on the area under continuous grazing there existed 9.4 percent of the ribes under 6 inches, 25.0 percent from 6.1 to 12 inches and 65.6 percent over 12.1 inches in height.

If the percentage compilations are studied in view of known efficiencies in ribes eradication as related to size of bush, there can be found no striking differences of deferred as compared to continuous grazing. On the basis of mathematical averages it is not advisable to draw immediate conclusions. The data will be subjected to a statistical analysis at some later date and the resulting information made known.

B. Ecological Studies of Ribes and Western White Pine

The Effects of Variable Light and Moisture Conditions on the Germination, Growth and Development of *R. lacustre*, *R. Viscosissimum* and *P. monticola*.

This ecological study was established in 1940 for the purpose of measuring important factors influencing germination survival and growth of the two major species of ribes in comparison to white pine under full sun, half shade and full shade light intensities. At each of these light stations seed of ribes and pine were sown on natural duff, mineral and burned-mineral soil surfaces. Ribes were removed from the plots in 1943 at the close of the third growing season. Previous discussions of this study have been made in the 1940 to 1943 annual reports.

TABLE 6

NUMBER OF RIBES AND WHITE PINE SEED GERMINATING DURING THE SEASONS 1941, 1942, 1943 and 1944, TOTAL SEED GERMINATING DURING THIS PERIOD AND PERCENT OF TOTAL SEED SOWN GERMINATING

Surface	Species	Light Intensity	Number Seed Germinating by seasons				Total Seed Germinating	Percent of Total Seed Sown Germinating
			1941	1942	1943	1944		
Duff	Ribes lacustre	Full Sun	15	674	19	0	708	4.4
		Half Shade	42	1,348	239	12	1,641	10.3
		Full Shade	771	5,968	479	297	7,515	47.0
	Ribes viscosissimum	Full Sun	16	2	0	0	18	.1
		Half Shade	54	1	0	0	55	.3
		Full Shade	238	0	68	15	371	2.3
	Western White Pine	Full Sun	20	6	0	0	26	1.3
		Half Shade	49	90	5	0	144	7.2
		Full Shade	841	212	37	0	1,090	54.5
Mineral	Ribes lacustre	Full Sun	3,184	2,134	57	0	5,375	33.6
		Half Shade	2,725	6,078	367	16	9,186	57.4
		Full Shade	1,937	6,191	1,992	365	10,485	65.5
	Ribes viscosissimum	Full Sun	1,322	7	0	0	1,329	8.3
		Half Shade	1,092	11	0	0	1,103	6.9
		Full Shade	1,083	0	3	18	1,104	6.9
	Western White Pine	Full Sun	883	14	0	0	897	44.8
		Half Shade	1,170	29	11	0	1,210	60.5
		Full Shade	1,434	44	21	0	1,499	74.9
Burned-Mineral	Ribes lacustre	Full Sun	1,966	5,967	23	0	7,956	49.7
		Half Shade	2,650	8,493	437	7	11,587	72.4
		Full Shade	2,233	6,326	1,183	52	9,794	61.2
	Ribes viscosissimum	Full Sun	740	13	0	0	753	4.7
		Half Shade	1,556	19	0	0	1,575	9.8
		Full Shade	1,554	0	44	7	1,605	10.0
	Western White Pine	Full Sun	314	1	0	0	315	15.7
		Half Shade	1,200	39	7	0	1,246	62.3
		Full Shade	1,379	49	13	0	1,441	72.0

Table 6 shows the number of ribes and white pine seed germinating during the four seasons 1941 to 1944 on the three soil surfaces under the three intensities of light. The total number of seed germinating during the four seasons as well as the percent of total seed sown which germinated are also given. Ribes seeds were sown at the rate of 800 seeds per square foot, a total of 16,000 for each soil surface. White pine seeds were sown at the rate of 100 per square foot and totaled 2,000 seeds for each plot. The number of seed germinating in 1944 includes seedlings from the three subplots of each surface disturbed when ribes were removed by pulling and the two subplots or controls

from which bushes were removed by cutting at ground level. Pruning shears were used in the latter case to leave ground undisturbed for continued observation on germination period of total seed sown.

The percent of total seed sown which germinated increased toward conditions of full shade with the exception of R. lacustre seed on burned-mineral soil. It is interesting to note the longer period over which R. lacustre seeds have germinated in large numbers as compared to the germination of R. viscosissimum seed. The disturbance of the three subplots on each of the soil surfaces failed to materially alter the trend of germination for R. viscosissimum seed. Germination of white pine seed did not extend beyond the third growing season.

TABLE 7

NUMBER OF SEED GERMINATING ON DISTURBED AND UNDISTURBED
SOIL SURFACES WHEN CALCULATED ON THE BASIS OF
TOTAL AREA SOWN PER SPECIES IN EACH PLOT

Surface	Status of Surface	R. lacustre			R. viscosissimum			White Pine		
		Full Sun	Half Shade	Full Shade	Full Sun	Half Shade	Full Shade	Full Sun	Half Shade	Full Shade
Duff	Disturbed	0	17	470	0	0	18	0	0	0
	Undisturbed	0	3	25	0	0	0	0	0	0
Mineral	Disturbed	0	22	578	0	0	23	0	0	0
	Undisturbed	0	5	30	0	0	0	0	0	0
Burned- Mineral	Disturbed	0	10	75	0	0	13	0	0	0
	Undisturbed	0	2	12	0	0	0	0	0	0

Table 7 shows the number of species of seeds germinating on the disturbed and undisturbed surfaces of duff, mineral and burned-mineral soils under the three intensities of light. Each value has been raised to the area-basis representing five subplots for ease of comparison. As the removal of ribes was timed to correspond with initial ribes eradication on recent cutover lands, the resulting disturbance was responsible for considerable germination of R. lacustre seed under conditions of full shade. The only seed of R. viscosissimum germinating is observed to be under conditions of full shade. The conclusion can be drawn therefore that length of time seed will remain viable where stored under natural conditions is dependent upon conditions of soil moisture, soil temperature, and upon aeration. Under the extreme soil temperature and desiccated conditions of full sun ribes seeds appear to lose viability within a relatively few years. With a lowering of soil temperature toward conditions of full shade the period during which ribes seeds remain viable is significantly extended. The mineral surface under both half and full shade conditions was most favorable for longevity of ribes seeds followed by the duff and burned-mineral surfaces. The duff surface affords protection in that ribes seeds filter down through the loose organic material and come to rest well buried within the insulating layer where soil temperature and moisture are held rather

constant. The above knowledge assumes particular importance in the coordination of ribes ecology with timber management practices in the western white pine type. Practical application of knowledge gained from this study is given in the summary section of this report.

Longevity of Ribes Seeds as Affected by Change of Environmental Conditions Resulting from Cutting of Mature Timber

Ribes seeds in storage beneath the humus layer of the forest floor are capable of retaining viability for a period at least equal to the life of a timber stand. Much of these stored ribes seeds germinate upon harvesting of the maturing forest crop. Germination results from a disturbance of the forest floor and the increase of light which raises soil temperature upon removal of the canopy. Since logging does not result in 100 percent disturbance of the forest floor much ribes seed remains on the areas unaccounted for in or beneath the undisturbed organic material. This study has been undertaken to determine the status of such seed following the drastic change of environmental conditions brought about by cutting of the mature timber.

The long period of viability for ribes seeds results from the protection afforded by the insulating layer of organic material on the soil and the closed timber canopy. Both are responsible for maintenance of fairly constant conditions of soil moisture, soil temperature and the exchange of soil gases. Upon breaking of a forest canopy as by cutting and/or a disturbance of the forest floor environmental conditions under which ribes seed have been in storage are materially altered. The degree of this alteration is governed by the extent to which the canopy is removed and a disturbance made of the forest floor from logging operations. Soil temperatures rise as more sunlight permeates through to the forest floor as a result of cutting. With increased soil temperatures as a direct result of more sunlight reaching the forest floor soil moisture decreases through evaporation. Disturbing the forest floor results in aeration and the exposure of stored ribes seed for germination.

In order to interpret the regenerational problem of ribes in the sustained-management of partial white pine cuttings plots were established this past season on the Kaniksu, Coeur d'Alene and St. Joe Forests. The question is to determine what and for how long a potential problem of ribes regeneration exists on these areas following the bulk of seed germination after the initial cut of mature volume. Of particular interest will be the effects of drastic environmental changes brought about by cutting upon the viability of ribes seed failing to germinate within a short interval after cutting. General observations indicate that viability of ribes seed decreases as years from time of logging or shortly thereafter increase. There is a possibility that a large proportion of the stored ribes seed germinates but never becomes visible as established seedlings because germination occurred at a soil depth greater than the length of the seedling hypocotyl. Again it seems quite apparent that a large proportion of the ungerminated seed retains viability for many years following cutting and the resulting change of environment.

A Latin Square plot having a dimension of seven milacres was employed for this

study. Each tier of seven milacres has been established separately to avoid areas of burned slash piles and major skid trails. One milacre was selected by random drawing as a check and another for 100 percent disturbance. Ribes were first removed from each milacre and the number of bushes recorded. Regeneration from this disturbance will be followed on six of the seven milacres in each tier until an additional milacre is scheduled for disturbance. On the milacre selected at random for disturbance all vegetative growth was removed. The ground was then thoroughly chopped with a Pulaski tool and raked until the humus became smoothly mixed with about $\frac{1}{2}$ inch of top soil. Every two years an additional milacre will be similarly prepared to study the number of ribes seedlings germinating and period of viability of stored seed following cutting. Five milacres remain in each tier of seven for future disturbance at two-year intervals. This study will be supplemented with the collection and extraction of ribes seeds for germination tests from areas representing cutting of various ages. Plots have now been established in the LaClere Creek drainage of the Kaniksu; Iron Creek, Potter Creek and Sands Creek on the Coeur d'Alene Forest and in the Merrie Creek drainage on the St. Joe Forest. Additional series will be established throughout the region next season for wider coverage of ecological conditions and intervals after cutting.

C. Tests of Ammonium Sulfamate for Ribes Eradication.

Results of the 1943 fall series of sulfamate spray plots were recorded in early June and confirmed by periodic inspections during the field season. Data in table 8 show that all dosages from 1 to 8 pounds per milacre killed 100 percent of the R. lacustre. Several R. petiolare plants on the 3-pound dosage plot were killed. These results show ammonium sulfamate to be a highly promising herbicide on stream-type R. lacustre.

During the field season of 1944, six dosages of ammonium sulfamate (1/2 to 6 lbs. per milacre) were applied to R. lacustre plots in the immediate vicinity of the 1943 plots on Crystal Creek, St. Joe National Forest. These dosages were replicated in early June, mid-July, and early September. A summary of data for the 1944 tests at Crystal Creek is given in table 9.

Observations made late in the season indicated that ammonium sulfamate was again exhibiting high toxicity to R. lacustre and that early and late season treatments might prove to be more effective than mid-season treatments. Although no conclusion can be reached on this latter point until the plots are examined next year, it might be noted that combined observations in California and Idaho suggest that low soil moisture and high soil temperature tend to reduce the effectiveness of ammonium sulfamate as a herbicide.

Sulfamate tests were also made on R. viscosissimum located at the head of the LaClere Creek drainage, Kaniksu National Forest. Data on these tests appear in table 10 and show that R. lacustre was also present on the plots. Early in September observations indicated that R. viscosissimum might not be as susceptible to ammonium sulfamate as stream-type R. lacustre and that this ecologic form of R. lacustre (Crystal Creek plots) appeared to be more sus-

ceptible to sulfamate than the upland-type R. lacustre occurring on the LaClerc plots.

On September 9, in addition to the spray tests reported in table 10, several large and rockbound bushes of R. lacustre and R. viscosissimum were treated with ammonium sulfamate spray (1 lb. of chemical per gallon of water). Four large R. viscosissimum and 5 clumps of R. lacustre were located on the uphill side of the motor road at the head of the drainage about 1/4 mile on the Idaho side from the summit of the LaClerc Creek divide. Treatment was made in what might be called a "practical manner" to determine the effectiveness of this chemical on large, rockbound bushes. Dosage was estimated to be about 3 pounds per milacre. All treated bushes or clumps were marked by a numbered stake.

TABLE 8

RESULTS OF 1943 SPRAY AND SOIL DRENCH TESTS (FALL SERIES) OF AMMONIUM SULFAMATE ON R. LACUSTRE, CRYSTAL CREEK, ST. JOE NATIONAL FOREST

Plot No.	Ribes Data (Per Milacre)			Pounds of Chemical Per Milacre	Percent Kill ^{1/}	
	No. of Bushes	Feet of Live Stem	Percent of Plot Occupied by Ribes		Bushes	Live Stem
3	11	250	45	1 ^{2/}	100	100
1	18	550	65	2	100 ^{3/}	100
5	13 ^{4/}	500	85	3	100	100
2	16	375	80	5	100	100
6	13	400	70	6	100	100
4	13	600	80	8	100	100

^{1/}Grass and shrubby vegetation associated with ribes were largely killed by dosages in excess of 2 pounds. Brush killed included rose, alder, dogwood, and elderberry. All plots were treated on September 9, 1943.

^{2/}Two gallons of water used; all other dosages dissolved at rate of 1 gallon of water for each pound of chemical.

^{3/}One small R. lacustre survived along margin of plot in heavy sod.

^{4/}In addition to the R. lacustre there were three R. petiolare with 25 FLS. All killed.

TABLE 9

1944 SPRAY AND SOIL DRENCH TESTS OF AMMONIUM SULFAMATE ON R. LACUSTRE
CRYSTAL CREEK, ST. JOE NATIONAL FOREST

Plot No.	Ribes Data (Per Milacre)		Dosage (Per Milacre)	
	Percent of Plot Occupied by Ribes	Feet of Live Stem	Lbs. of Chemical	Gals. of Water
Spring series ^{1/}				
7	30	350	2	2
8	20	200	1	2
9	60	600	3	3
10	40	600	4	4
11	20	200	1/2	1
12	50	500	6	6
Summer series ^{2/}				
13	75	1,050	1/2	1
14	55	875	1	2
15	40	650	2	2
16	60	950	3	3
17	40	575	4	4
18	60	700	6	6
Fall series ^{3/}				
19	40	450	6	6
20	30	325	2	2
21	40	350	3	3
22	25	250	1	2
23 ^{4/}	15	175	1/2	1
24 ^{5/}	40	400	4	4

^{1/}Applied June 10.

^{2/}Applied July 18.

^{3/}Applied September 5.

^{4/}Also R. petiolare (60 FLS).

^{5/}Also R. petiolare (25 FLS).

TABLE 10

1944 SPRAY AND SOIL DRENCH TESTS OF AMMONIUM SULFAMATE ON R. VISCOSISSIMUM
AND UPLAND R. LACUSTRE, LACLERC DRAINAGE, KANIKSU NATIONAL FOREST

Plot No.	Ribes Data (Per Milacre)		Dosage (Per Milacre)	
	No. of Bushes	Feet Live Stem	Lbs. of Chemical	Gals. of Water
Spring series ^{1/}				
1	29 V. 1 L.	232 8	4	4
2	37 V. 1 L.	240 4	2	2
3	43 V. 1 L.	250 7	1	1
4	34 V. 2 L.	272 40	1/2	1
Fall series ^{2/}				
5	26 V. 1 L.	425 25	4	4
6	14 V. 17 L.	125 225	3	3
7	18 V.	275	6	6

^{1/} Applied June 14.

^{2/} Applied September 9.

III. LABORATORY, GREENHOUSE, AND SPECIAL ACTIVITIES

The laboratory, greenhouse, and ribes garden at Berkeley were actively maintained throughout 1944 without the benefit of part-time assistants. Laboratory and greenhouse facilities at Moscow were used to stratify and to pre-germinate a number of lots of western white pine seed for planting tests.

Special activities at Berkeley and at Spokane during the year have included: (1) Compilation and analysis of disease study data for the purpose of devising a dependable sampling method for use in running a partial check of large field plots. (2) Preparation of reports for the Forest Service on blister rust control in relation to management of western white pine. (3) Compilation and analysis of data on ten years of tests on germination of ribes seeds. (4) Laboratory and greenhouse tests on factors affecting the germination of ribes seeds. (5) Chemical tests for the identification of infection zone in tissue of white pine and sugar pine. Field tests undertaken in July with alpha-naphthol on freshly cut cankers showed definite indication of abnormal tissue in both proximal and distal zones beyond the limits of bark discoloration visible to the naked eye. Tests for nitrate (diphenylamine reagent) and for phosphate (ammonium molybdate reagent) in the bark and stem cambium of infected branches showed an accumulation of these two nutrients in the proximal zone of the canker. (6) Toxicity tests with various plant hormones and mixtures of hormones with ammonium sulfamate, ammonium thiocyanate and sodium chlorate. A new technique was worked out using Lemna minor (duckweed) for rapid evaluation of the toxicity of these new herbicides. The more promising herbicides were then tested by treating greenhouse grown barley plants; herbicides showing high toxicity to barley were then tested on ribes plants. As a result of these tests two new herbicidal mixtures consisting of (a) ammonium sulfamate, phenylacetylene and furfural and (b) ammonium sulfamate and glycerine were tested in the field in California. (7) New equipment was devised and tested for comparing the barium nitrate equilibrium method with the standard sunflower technique for measuring the permanent wilting percentage of soils. Results to date with this new equipment showed agreement within 1 or 2 percent of the sunflower method. For the forest soils tested, R. roezli has previously been shown to reach the permanent wilting point slightly below that of the sunflower. Thus the new method should meet our requirements nicely. (8) Cooperation in field activities on barberry eradication, control of pear Psylla and eradication of poison oak at Camp Adair, Oregon.

In addition to the above work, the following processed or printed reports were made available to Blister Rust personnel during the calendar year of 1944:

Serial No. 121:

"A Study of the Effects of Aeration on the Germination of Ribes Seeds During and Following Stratification.

.....L. P. Winslow

Serial No. 122:

"Observations on the Regeneration of Upland-Type Ribes in White Pine Areas of the United States.

.....H. R. Offord

Self-Incompatibility in Several Species of Ribes in the Western States.
Journ. Agric. Research 68: 65-71 (1944).

.....H. R. Offord,
Clarence R. Quick and
Virgil D. Moss

The Effects of Snowbrush on the Growth of Sierra Gooseberry.
Journ. Forestry 42: 827-832 (1944).

.....Clarence R. Quick

Damage to Conifers in Northern Idaho by the Richardson Red Squirrel.
Journ. Forestry 42: 143-144 (1944).

.....C. R. Stillinger

Notes on Cronartium Occidentale. Northwest Science XVIII No. 1: 11-16 (1944)

.....C. R. Stillinger

PHOTOGRAPHIC AND EDUCATIONAL WORK, 1944

By

Frank O. Walters, Assistant Regional Leader

H. Miller Cowling, Photographic Specialist

During the year 1944 the essential elements of the education and photographic section received as much attention as time facilities permitted.

The services of the photographic section were extended to the Sugar Pine Region and the Pear Psylla Control.

A. Photographic Section

The purpose of this section is: (1) To maintain a pictorial record of control and investigative work, (2) to supply photographs, charts, maps and manuals for facilitating the field work, and (3) supply material for educational purposes.

All the work during 1944 was held to a minimum, covering only those subjects which were judged essential to the program.

Although photography is the major project of this section production of material also involves Multilith offset printing, black-line printing and mimeograph work. A summary of the 1944 work is given in the following table:

PHOTOGRAPHIC, MULTILITH, BLACK-LINE AND MIMEOGRAPH WORK

Item	North-western Region	Sugar Pine Region	Pear Psylla Control	Total
PHOTOGRAPHIC				
Lantern slides, natural color	126			126
Films developed, rolls or packs	5	1	4	10
Films developed, field films	196		29	225
Copies, 5x7	35	1	149	185
8x10	5	1	45	51
Printing, 4x5 or smaller	54	102	185	341
5x7	3,031	140	158	3,329
8x10	8	21	2	31
9x11	384	16	531	931
Enlarging, 11x14 or smaller		10	93	103
16x20	2	7	3	12
20x24	6		9	15
Total Items	3,852	299	1,208	5,359
MULTILITH				
Copies	51	44	17	112
Plates made	53	49	33	135
Cards printed	8,300	2,000	77,200	87,500
Cards printed, reverse	4,000	2,000	77,200	83,200
Total cards	12,300	4,000	154,400	170,700
Paper printed	11,300	30,100	72,600	114,000
Paper printed, reverse	2,000	8,000	29,000	39,000
Total paper	13,300	38,100	101,600	153,000
Total Items	25,704	42,193	256,050	323,947
BLACK-LINE PRINTER				
Total maps, printed	629		3,143	3,772
MIMEOGRAPH				
Total paper	34,430			34,430
Grand Total All Items	64,615	42,492	260,401	367,508

B. Educational Section

Practically all members of the technical staff contributed to the educational phase of the program. As many of the workers were from distant parts of the country an excellent opportunity was available for a wide dissemination of information relative to Blister Rust Control. Informal discussions and talks were carried on in most camps as well as considerable on-the-job education.

Nation-wide use is being given some of the photographic studies depicting the regeneration and growth of white pine over a period of years. Pictures of such studies appeared in an American Forest Products publication, The Timberman, The Tenth Biennial Report of the State Forester, State of Idaho. One series was also used in the material presented to the Budget Bureau.

Several motion picture shots have been taken and will be included in the western blister rust film as a means of improving the picture.

1. Bulletins and posters. Bulletins and literature were made available to all camps. Distribution of 137 bulletins was made to persons calling at the Spokane office and 500 were given out at the Spokane County Fair.

Posters were displayed in most of the camps.

2. Talks, slides and motion pictures. Talks on blister rust were given at Baxter General Hospital and the Sandpoint Kiwanis Club. Slides were used in one talk.

A wider use was made of motion pictures this year than for some time.

A pickup truck equipped with a power generator made the rounds of the camps showing the western blister rust film as well as other forestry films. Numerous other showings were made before various groups. A total of 47 showings was made before 1,915 people. The Northeastern Region reports that during the past two years the Western Blister Rust film being used in the East has had 52 showings before 5,902 people.

One diorama setup made at the Spokane County Fair was well received.

APPROPRIATIONS
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
NORTHWESTERN REGION

Regular Appropriations

Fiscal Year 1944:

Project 3101.14 (Administrative)	\$93,700.00	
Project 3103.14 (Cooperative)	<u>68,538.00</u>	\$162,238.00

Fiscal Year 1945: (as of 12/31/44)

Project 3101.14 (Administrative)	\$88,675.00	
Project 3103.14 (Cooperative)	<u>64,870.00</u>	\$153,545.00

Contributed Funds: (deposited with U. S. Treasury)

State of Idaho	\$15,000.00	
Clearwater Timber Prot. Assn.	\$6394.50	
Potlatch Timber Prot. Assn.	4959.06	
Priest Lake Timber Prot. Assn.	<u>4259.42</u>	<u>15,612.98</u>
		\$30,612.98

ALPHABETICALLY
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
NORTHWESTERN REGION

Estimated Expenditures

Fiscal Year 1945:

Project 101.11 (Administrative) \$10,750.00
Project 102.12 (Cooperative) \$8,508.00

\$19,258.00

Fiscal Year 1946: (as of 10/1/44)

Project 101.11 (Administrative) \$10,750.00
Project 102.12 (Cooperative) \$8,508.00

\$19,258.00

Contributed Funds (deposited with U. S. Treasury)

State of Idaho \$1,000.00
University of Idaho \$1,000.00
Private Law \$1,000.00
Private Law \$1,000.00

\$4,000.00

TABLE 1

FEDERAL EXPENDITURES, NORTHWESTERN REGION OF BLISTER RUST CONTROL,
CALENDAR YEAR 1944, REGULAR APPROPRIATIONS

Project		Salaries	Expense	Total
January 1 to June 30, 1944				
I	Planning, Coordination and Technical Direction			
	1.1 - Clearwater Operation, Idaho	\$ 7,452.78	\$1,104.28	\$ 8,557.06
	1.2 - St. Joe Operation, Idaho	8,564.68	1,095.36	9,460.04
	1.3 - Coeur d'Alene Operation, Idaho	1,892.11	54.57	1,946.68
	1.4I - Kaniksu Operation, Idaho	6,092.52	786.68	6,879.20
	1.6C - Cabinet Operation, Montana	957.06	141.70	1,098.76
	1.6K - Kootenai Operation, Montana	957.06	62.67	1,019.73
	1.7G - National Park, Glacier	172.01	84.36	256.37
	1.7R - National Park, Rainier		31.98	31.98
	1.A - Office Maintenance	9,881.25	2,619.31	12,500.56
	1.B - Supervision	5,028.24	208.15	5,236.39
	1.C - Education and Information	1,561.34	147.42	1,708.76
	1.D - Control Investigations	2,321.12	61.00	2,382.12
	1.E - Methods Development		19.28	19.28
	Total, Project I, January 1 to June 30, 1944	\$44,680.17	\$6,416.76	\$51,096.93
III	Cooperative Ribes Eradication on State and Private Lands			
	3.1 - Clearwater Operation, Idaho	3,350.73	2,919.44	6,270.17
	3.2 - St. Joe Operation, Idaho	9,538.37	10.00	9,548.37
	3.4I - Kaniksu Operation, Idaho	2,625.66	2,192.41	4,818.07
	Total, Project III, January 1 to June 30, 1944	\$15,514.76	\$5,121.85	\$20,636.61
July 1 to December 31, 1944				
I	1.1 - Clearwater Operation, Idaho	5,765.12	778.67	6,543.79
	1.2 - St. Joe Operation, Idaho	6,628.70	1,268.62	7,897.32
	1.3 - Coeur d'Alene Operation, Idaho	1,229.09	63.97	1,293.06
	1.4I - Kaniksu Operation, Idaho	*1,721.27	821.71	2,542.98
	1.6C - Cabinet Operation, Montana	** 163.68	100.79	264.47
	1.6K - Kootenai Operation, Montana	** 163.68	84.11	247.79
	1.7G - National Park, Glacier	344.02	7.36	351.38
	1.7R - National Park, Rainier	344.02	76.35	420.37
	1.7Y - National Park, Yellowstone	498.46	158.69	657.15
	1.A - Office Maintenance	9,707.45	2,440.66	12,148.11
	1.B - Supervision	4,943.69	648.66	5,592.35
	1.C - Education and Information	1,561.34	59.11	1,620.45
	1.D - Control Investigations	751.47	51.65	783.12
	1.E - Methods Development		14.06	14.06
	Total, Project I, July 1 to December 31, 1944	\$33,801.99	\$6,574.41	\$40,376.40
III	3.1 - Clearwater Operation, Idaho	19,726.64	6.83	19,733.47
	3.2 - St. Joe Operation, Idaho	20,022.51	100.00	20,122.51
	3.4I - Kaniksu Operation, Idaho	18,945.76	38.98	18,984.74
	Total, Project III, July 1 to December 31, 1944	\$58,694.91	\$ 145.81	\$58,840.72

*Net amount after crediting repayment by the Forest Service of the salaries of H. A. Brischle and L. J. Easley for the period 7/1-12/31/44.

**Net amount after crediting repayment by the Forest Service of the salary of A. S. Skoglund for the period 7/1-11/30/44.

[illegible]

1. A. B. found for the period 7-1-1944.
2. Amount after credited repayment by the Forest Service of the salary of
J. A. Brantley and L. J. [redacted] for the period 7-1-1944.
3. Amount after credited repayment of the Forest Service of the salaries of

TABLE 2
SUMMARY OF EXPENDITURES FROM STATE AND
PRIVATE FUNDS, 1928 - 1944, IDAHO

Year	State	Private	Total
1928	\$ 2,518.55	\$ 2,264.32	4,782.87
1929		19,027.66	19,027.66
1930		20,000.00	20,000.00
1931	5,000.00	35,905.32	40,905.32
1932	8,003.43	11,186.33	19,189.76
1933			
1934	29,154.06		29,154.06
1935	15,000.00		15,000.00
1936	16,998.25		16,998.25
1937	15,001.25		15,001.25
1938	15,000.44		15,000.44
1939	15,438.04		15,438.04
1940	10,034.48		10,034.48
1941	7,542.73	15,756.40	23,299.13
1942	22,761.68	15,440.78	38,202.46
1943	12,252.13	386.68	12,638.81
1944	12,506.60	15,612.98	28,119.58
Total	\$187,211.64	\$135,580.47	\$322,792.11

Organization of the Northwestern Regional Office

1. Regional Leader in Charge, H. E. Swanson, Pathologist
2. Assistant Regional Leader, F. O. Walters, Pathologist
3. Cooperative Local Control:
 - a. Clearwater Operation, Idaho:
Operation Supervisor, H. J. Faulkner, Forester
Checker Foreman, J. C. Gonyou, Field Aid
 - b. St. Joe Operation, Idaho:
Operation Supervisor, F. J. Heinrich, Pathologist
Assistant Operation Supervisor, W. F. Painter, Pathologist
Camp Superintendent, G. W. Schmaltz, Agent
Special Duty Assistant, R. E. Myers, Agent
 - c. Coeur d'Alene Operation, Idaho:
Operation Supervisor, M. C. Riley, Forester
 - d. Kaniksu Operation Idaho-Washington:
Operation Supervisor, H. A. Brischle, Pathologist
Assistant Operation Supervisor, L. J. Easley, Agent
 - e. Montana Operation:
Operation Supervisor, A. S. Skoglund, Pathologist
 - f. National Parks:
Operation Supervisor, M. C. Riley, Forester
C. M. Chapman, Pathologist
4. Projects:
 - a. Education and Information:
H. M. Cowling, Photographic Specialist
 - b. Methods Development and Control Investigations: Work Project BLR-1-6
V. D. Moss, Forest Ecologist
J. F. Breakey, Pathologist
C. R. Stillinger, Pathologist

(Personnel assigned to Northwestern Region by H. R. Offord)
5. Business Administration and Clerical:
 - a. E. G. Schmidt, Administrative Assistant
E. K. LaPrey, Storekeeper
L. C. Miller, Automobile Mechanic
 - b. M. L. McWold, Administrative Assistant
M. Wilson, Clerk
 - c. M. M. McLean, Clerk-Stenographer
D. W. Boyer, Clerk-Stenographer
B. J. Coon, Clerk-Stenographer
 - d. L. E. Klatt, Administrative Assistant - Personnel

Members of the Permanent Staff on Military Furlough: CCM John C. Gynn, Forester; Cpl. Homer J. Hartman, Pathologist; Capt. Edward L. Joy, Forester; Lt. Howard D. Langley, Administrative Assistant; Major Albert L. Pence, Jr., Forester; Y 3/c Jean R. Pringle, Clerk-Stenographer.





ANNUAL REPORT
ON
THE CONTROL OF WHITE PINE BLISTER RUST
IN THE
PACIFIC COAST REGION
FOR THE
CALENDAR YEAR 1944

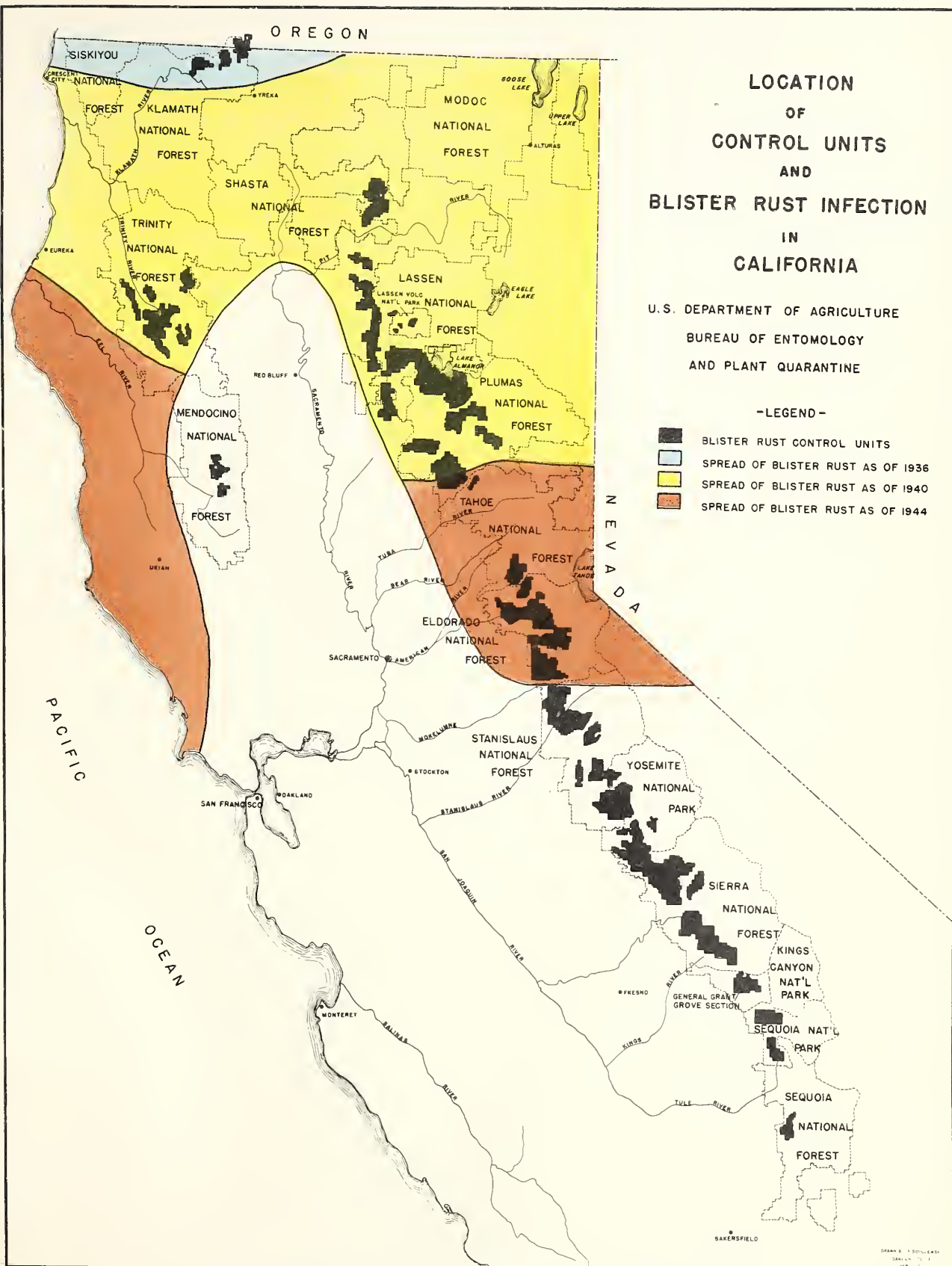
United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine
Pacific Coast Regional Office
610 Syndicate Building
Oakland 12, California
March 1945

LOCATION OF CONTROL UNITS AND BLISTER RUST INFECTION IN CALIFORNIA

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY
AND PLANT QUARANTINE

-LEGEND-

-  BLISTER RUST CONTROL UNITS
-  SPREAD OF BLISTER RUST AS OF 1936
-  SPREAD OF BLISTER RUST AS OF 1940
-  SPREAD OF BLISTER RUST AS OF 1944



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WHITE PINE BLISTER RUST CONTROL IN THE PACIFIC COAST REGION

ANNUAL REPORT FOR 1944

PART I

HIGHLIGHTS OF 1944

By

Warren V. Benedict, Regional Leader

This report, prepared by members of the Pacific Coast Regional Office of the Bureau of Entomology and Plant Quarantine under project 3101, includes the results of all control activities of the operating agencies in the Region for calendar year 1944.

Following Part I, which deals with highlights of the program during the year, will be found detailed reports of each work project.

Spread of the Rust

The most significant development of 1944 was the 65-mile southward extension of blister rust infection on ribes in California. This advance of the disease moved the forward zone of known infection from the northern tip of the Tahoe National Forest across that Forest and to a point near Lumberyard Ranger Station at the southern boundary of the Eldorado National Forest. This southernmost infection point is about in the center of the commercial sugar pine belt, some 240 miles from the northern California border.

The year was also favorable for the spread of the native pinyon rust (Cronartium occidentale), and the presence of this rust on ribes throughout the Sierras and often in the same locality as blister rust complicated the determination of the extent and spread of white pine blister rust.

Diseased ribes were found for the first time in Placer, Eldorado, and Amador Counties in California. There were more infected pines and ribes in the Region during 1944 than in any previous year. Ribes sanguineum in particular was found to be generally and heavily infected on the Klamath National Forest and areas north. Infection on pine is now common in Siskiyou County, California, where there are several local spots of severe damage to young trees. Scattered pine infections have also been found in Shasta, Trinity, Del Norte, Tehama, Butte, Plumas, and Yuba Counties, and ribes infections were numerous in these counties in 1944.

Weather conditions during the spring and early summer favored the infection and development of the fungus on ribes, but were less favorable to its return to pines in the late summer and early fall. However, during October there were several periods of light rains and fog that likely resulted in some pine infection. The extent of such infection will not be known until the cankers develop and become visible on the pines three or four years hence.

Several additional pine infections were found on the Lassen and Plumas National Forests, and in each case the infected young pines were destroyed. Canker removal work was continued on the Klamath control units and on and near control units in Oregon. In all, 213,986 cankers were removed from 10,449 pines. As explained last year, the purpose of this work is to delay rust build-up as much as possible by a reduction of the near-at-hand sources of spores during the early stages of rust development.

Control Accomplishments

The ribes eradication project was continued as a cooperative job under the leadership and technical direction of the Bureau of Entomology and Plant Quarantine. Participating agencies included Regions 5 and 6 of the U. S. Forest Service, Region 4 of the National Park Service, the O and C Revested Lands Administration, the States of California and Oregon, the Diamond Match Company, and the Michigan-California Lumber Company. The 1944 ribes eradication project employed at the peak of the season 1,680 workers who were housed in 30 camps. These were distributed by operating agencies as follows:

U. S. Forest Service	16 camps and 960 workers
National Park Service	4 camps and 200 workers
Oregon & California	
Revested Lands Administration..	1 camp and 45 workers
Bureau- Coop.	9 camps and 475 workers

Accomplishments of these operating agencies are shown in table 1.

TABLE 1

SUMMARY OF RIBES ERADICATION WORK IN 1944

Operating Agency	Expenditures	Acres Worked		Ribes Destroyed	8-Hour Man Days Expended
		Initial Erad.	Reeradication		
U. S. Forest Service	\$423,458	10,920	23,293	4,186,712	30,272
National Park Service	80,637	1,123	4,248	922,045	7,905
O&C Rev. Lands Adm.	27,217	2,469	126	99,447	1,183
Bureau-Coop.*	172,370	8,873	2,736	2,188,828	13,796
Total	\$703,682	23,385	30,403	7,397,032	53,156

*Cooperative work on lands predominantly in state and private ownership by the Bureau of Entomology and Plant Quarantine, the State of California, and the Michigan-California and Diamond Match Lumber Companies. Of the total of \$172,370 expended by the cooperative project, \$100,982 was Federal funds, \$65,288 was State of California funds, and \$6,100 was lumber company funds.

Because of the intermingled pattern of land ownership prevailing in the sugar pine belt it is not practicable for an operating agency consistently to work only its own holdings. Moreover, the status of land ownership is constantly changing. Therefore, it is necessary for each operating agency to work some interspersed lands of other ownership. Park Service holdings are more nearly in solid ownership units than those of other agencies. Work units are in general laid out to make these exchanges as compensating as possible.

During 1944 the ownership of lands worked by operating agencies was as follows:

TABLE 2

OWNERSHIP OF LANDS WORKED IN 1944

Operating Agency	Total Acres Worked	Recapitulation of Acres Worked by Ownership			
		National Forest Lands	National Park Lands	O & C Revested Lands	State and Private Lands
U. S. Forest Service	34,213	20,191		486	13,536
National Park Service	5,371		5,371		
O&C Rev. Lands Adm.	2,595	36		784	1,775
Bureau-Coop.	11,609	3,544			8,065
Totals	53,788	23,771	5,371	1,270	23,376

In light of rust development as the disease spreads southward in the Region and the large job of ribes eradication remaining to be done on the white pine areas now scheduled for protection, the accomplishments in 1944 were far short of the annual need. The limited labor supply, the short work season, and the sub-normal productiveness of the labor available were the factors largely responsible for this situation. Special care was taken in applying the limited resources of 1944 in a manner where they would accomplish the greatest permanent over-all good. Of necessity the control program had to be operated pretty much on the basis of holding the progress already made. This meant a reduction of initial work on unprotected areas with the emphasis given to reworking areas previously treated where ribes regeneration was advanced and required immediate attention. The initial work done was confined largely to areas where the rust is present or where it is likely soon to become established in sites most favorable to its incidence and development.

Under this plan some ground is being lost because war conditions do not permit operations on a scale sufficiently large to take care of all needed initial and rework. The control job has been complicated by the abnormal cutting in sugar pine types to meet war demands. This acceleration of logging adds extensive acreage to the cut-over category, which from the standpoint of ribes suppression and rust hazard should be worked promptly. Under the curtailed program it is not possible to do the ribes eradication work at the time it should be done to be most effective. As a consequence, the over-all cost of control on cut-over lands will be greater than would be the case if a normal work schedule could be followed.

The war emergency, with the resulting scarcity of labor, supplies, equipment, and the promulgation of numerous restrictive orders circumscribing their use, rendered more difficult the operation of the field projects. The work was adjusted to meet the special problems arising, by employing labor not needed by wartime industry, by leaving unfilled some vacancies of permanent personnel called into military service, by holding use of equipment and supplies to a minimum consistent with effective project operation, and by adopting every possible economy.

Again in 1944 the principal source of labor was 16 and 17 year old high school boys and to a limited extent convicts and transients. This labor was sub-standard both in quantity of work produced and in quality of performance. The school boys were available for but a two and a half month period, which is half the normal work season. Sufficient clerks and assistant camp bosses were never obtained, and some camps operated short-handed all season. Competent cooks and kitchen help were extremely difficult to secure, and the turnover in this group was high.

In spite of these handicaps effective progress was made in meeting the limited wartime objectives of treating areas where rework was most pressing and of reducing threatening pine infection centers.

Status of Control

At the end of 1944 the job of initial ribes eradication on the 2,571,712 acres of control area was 37% completed, and the total eradication job, including such successive reworkings as are necessary, was about one-fifth completed.

The amount of work done in the Region since control work was first undertaken in 1933 through 1944 is shown in table 3. This table outlines status of control by land ownership.

TABLE 3

STATUS OF CONTROL WORK IN THE PACIFIC COAST REGION IN 1944

Land Ownership	Acreage in Control Units	Acres Worked		Ribes Destroyed	8-Hour Man Days Expended
		Initial Erad.	Reeradication		
National Forest Lands	1,109,399	379,221	224,463	85,794,928	400,013
National Park Lands	287,694	89,146	17,492	18,947,696	129,931
O and C Revested Lands	129,709	38,776	90	734,562	10,516
Total Federal Lands	1,526,802	507,143	242,045	105,477,186	540,460
State and Private Lands	1,044,910	445,096	179,776	64,111,431	332,954
Totals	2,571,712	952,239	421,821	169,588,617	873,414

Expenditures

Expenditures on ribes eradication working during 1944 are shown in table 1.

Accumulated expenditures by agencies for ribes eradication work performed from 1933 to 1944 are shown in table 4.

TABLE 4

EXPENDITURES BY AGENCIES AS OF DECEMBER 31, 1944
FOR RIBES ERADICATION WORK

Agency	Type of Funds	Amount by Type of Funds	Total Expenditures
U. S. Forest Service	Regular	\$ 1,527,398	\$ 2,533,708
	WPA	509,542	
	CCC	219,841	
	PWA	276,927	
National Park Service	Regular	239,177	487,890
	CCC	198,713	
O & C Rev. Lands Adm.	Regular	115,336	115,336
Bureau*	Regular	498,706	3,020,558
	WPA (Fed.)	2,145,988	
	WPA (State)	20,666	
	PWA	352,692	
	NYA	2,506	
Total Federal			6,157,492
State of California			124,956
Private Lumber Companies			12,000
Total Expenditures			\$ 6,294,448

*In addition to Bureau expenditures for ribes eradication work \$1,181,919 have been expended for other activities such as leadership, coordination, and technical direction of the general control program, disease surveys and scouting, black currant eradication, and pine reconnaissance. Of this total \$860,154 was regular funds, \$188,512 WPA funds, and \$133,253 PWA funds.

Costs

For control work performed to date, the cost of an effective 8-hour man day of work has averaged \$7.20. Because of the rise in wages, the generally higher price level of the last few years, and the short work season over which to prorate camp operating costs, the cost per man day has risen above the average. In 1944 it was \$13.24.

The cost of ribes eradication work to date has averaged \$4.57 per acre. For 1944 the cost was \$13.08 per acre.

In conclusion attention should be called to the need for undertaking a large scale program as soon as possible if the disease is to be controlled most economically and effectively. Most of the control work still remains to be done. Too long a delay will result in the establishment of rust in all major pine stands with a consequent increase in the cost and in the technical difficulties of control.

PART II

LEADERSHIP, COORDINATION, AND TECHNICAL DIRECTION OF BLISTER RUST CONTROL BY THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Work Project BLR-1-5

By

John N. Mitchell, Forester, P-2

PURPOSE

Blister rust control work is conducted by several Federal agencies each on the land within its jurisdiction. Congress has vested the Bureau of Entomology and Plant Quarantine with responsibility for the leadership, coordination, and technical direction of all blister rust control work.

ORGANIZATION

The objectives of the project were carried out through the technical staff of the Bureau headquartered at Oakland, California. During 1944 staff members conferred with representatives of the cooperating agencies and coordinated the plans for control work. Technical advice and assistance were given cooperators during the period of the field work.

Staff of the Oakland Office in 1944

Warren V. Benedict, Forester, P-5. Regional Leader in Charge
Thomas H. Harris, Forester, P-4. Assistant Regional Leader

Control Operations

a. Oregon and the Klamath National Forest of California

Douglas R. Miller, Forester, P-3 . . Operation Supervisor
Lyle N. Anderson, Agent, P-2 . . . Assistant Operation Supervisor
Lawrence P. Winslow, Agent, P-2. . . On loan by the Berkeley Office

b. Lassen and Plumas Operations, Lassen Volcanic National Park

Benton Howard, Forester, P-3 . . . Operation Supervisor
E. Ross Ellis, Agent, P-2 . . . Assistant Operation Supervisor
Warren S. Burrill, Forester, P-2 . . Checking Supervisor

c. Eldorado Operation

Robert Sovulewski, Agent, P-3. . . Operation Supervisor

d. Stanislaus Operation

Carl W. Fowler, Forester, P-3. . . Operation Supervisor

e. Sierra National Forest, Yosemite, Kings Canyon, and Sequoia National Parks

Frank A. Patty, Pathologist, P-3 . . . Operation Supervisor
John N. Mitchell, Forester, P-2. . . . Assistant Operation Supervisor

Scouting and Disease Surveys

Douglas R. Miller, Forester, P-3 . . . Project Leader

Business Administration

Ralph H. Simons Administrative Assistant, CAF-9
(separated by transfer
January 16, 1944)
Orvis R. Decious Administrative Assistant, CAF-7
Loa H. Smith Clerk-Stenographer, CAF-4
(deceased July 26, 1944)
Juliana Arca Clerk, CAF-4
Marion A. Bruun
(formerly Marion A. Owen). Clerk, CAF-4
Aretta D. Miller Clerk-Stenographer, CAF-4
Mabel L. Louie Clerk-Typist, CAF-3
(appointed by transfer
December 26, 1944)
Virginia England Clerk-Stenographer, CAF-3
(appointed by transfer, June 1;
resigned December 8, 1944)
Roberta J. Bruun Clerk-Typist, CAF-2
(appointed June 26, 1944)
Grayce Harris Clerk-Typist, CAF-2
(appointed April 17; resigned
May 31, 1944)
Jean Rodrigues Clerk-Typist, CAF-2
(resigned March 31, 1944)
Marguerite Stewart Clerk-Typist, CAF-2
(appointed February 10, 1944)
Phyllis Verutti Clerk-Typist, CAF-2
(resigned February 15, 1944)
Richard F. Leahy Storekeeper, CAF-6

* * * * *
* It was with deepest regret that we learned of the death of *
* Mrs. Loa H. Smith, who passed away July 26 after a lingering *
* illness. *
* *
* Although no one could ever guess it from her cheerful de- *
* meanor, Loa had to live with the insidiousness of cancer for *
* a considerable period. During her last trying months she *
* displayed a fortitude to carry on and a will to conquer that *
* amazed everyone. *
* *
* In her passing we have missed a loyal and able co-worker and *
* a warm and friendly personality. *
* * * * *

Berkeley Office: Developmental Work in Control Methods

Harold R. Offord Pathologist, P-4, In Charge
Clarence R. Quick Forest Ecologist, P-3
Lawrence P. Winslow Agent, P-2
Catherine Ryan Clerk-Stenographer, CAF-3

Rates of Pay

Bureau wage rates for seasonal workers were the same as those appearing in the 1943 annual report with the exception of the new positions listed below:

<u>Pay Roll Title</u>	<u>Field Title</u>	<u>Monthly Base Pay</u>	<u>Monthly Overtime Allowance</u>	<u>Gross Pay</u>
Field Aid, SP-5	Assistant to Operation Supervisor	\$150.00	\$32.50	\$182.50
Cook, Unallocated	Cook	155.00	33.58	188.58
Cook, Unallocated	Cook	135.00	29.24	164.24
Clerk, CAF-3	Camp Clerk	135.00	29.24	164.24

WORK PERFORMED

Leadership and Coordination

The Bureau correlated the activities of the various agencies engaged in blister rust control work. The staff collaborated in the planning of projects and assisted in directing the various programs.

The agencies listed below engaged in or contributed to control work in the Pacific Coast Region in 1944:

1. Agencies engaged in control work.

a. United States Department of Agriculture

- (1) Bureau of Entomology and Plant Quarantine
- (2) Forest Service

b. United States Department of the Interior

- (1) National Park Service
- (2) Oregon and California Revested Lands Administration

2. Agencies participating financially in the cooperative control project.

- a. State of California (Division of Forestry, Department of Natural Resources). Appropriations have been made since 1941, the current one being \$100,000 for biennium July 1, 1943 to June 30, 1945.

- b. Diamond Match Company. Since 1942 has made a yearly contribution of \$2,000.
 - c. Michigan-California Lumber Company. Since 1942 has made a yearly contribution of \$2,000.
3. Agencies contributing facilities and services under Memoranda of Agreement with the Bureau of Entomology and Plant Quarantine.
- a. State of California
 - (1) Division of Forestry, Department of Natural Resources
 - (2) Department of Agriculture
 - (3) College of Agriculture, University of California
 - (4) Botanical Garden, University of California
 - b. State of Oregon
 - (1) Oregon State Board of Forestry
 - (2) Division of Plant Industry, Department of Agriculture

Funds remained for use in 1944 from the \$100,000 appropriated by the State of California for the biennium July 1, 1943 to June 30, 1945. During 1944 the Michigan-California Lumber Company and the Diamond Match Company continued their participation, each contributing \$2,000. Under the terms of the Lea Act the federal government matches such funds dollar-for-dollar and expends the sums on the cooperative project for the control of blister rust on state and private lands. Memoranda of Agreement (or Understanding) defining the relations and responsibilities of each party continued in effect between the Bureau and the cooperating agencies.

Recruitment of sufficient labor for the field program was a major undertaking. The Bureau recruited workers for all camps of the National Park Service and for some camps of the Forest Service through agreement with these agencies. On the other hand the Forest Service recruited students in the Los Angeles district for the use of the Bureau's employment pool. Conferences with the Civil Service and the War Manpower Commissions were held to draw up a labor recruiting plan in accordance with current policies and regulations. Letters seeking applicants were sent to schools and individuals in California and other points throughout the country. The United States Employment Service, the United States Forest Service, and the Division of Forestry of the State of California were helpful in the recruiting program. Efforts were made to hire veterans, but largely because the employment period is short, few were obtained. Available workers came almost entirely from high schools and were without experience. As a result of the recruiting, personnel was secured to man all the blister rust control camps. There was not, however, labor available to maintain the camps at full strength.

Technical Direction of Ribes Eradication

The Bureau's technical staff furnished its services to cooperating agencies, the principal functions being advising, planning, inspecting, and assisting the operation of the various field programs. Because of wartime shortages

of their own technical men, the Klamath, Eldorado, Stanislaus, and Sierra National Forests called upon the Bureau to a large extent for assistance in managing their blister rust control camps and field work.

The seriousness of the spread of the rust within the northern forests of the Pacific Coast Region led to increased spot working and canker removal as measures to delay rust spread until adequate labor is available for the necessary ribes eradication.

Checking

Checking work is essentially technical, hence the responsibility for its conduct falls to the Bureau. Checkers are hired by the Bureau and work under the direction of the Bureau on all operations. By agreement the Bureau is reimbursed for the salaries of checkers employed on the projects of other agencies.

A total of 43 men were hired as checkers. About one-half were high school students; the remainder were largely teachers and college students. The school teachers were outstandingly the best checkers according to post-season appraisals of the checking records.

A summary of the checking work appears at appropriate places further in this report.

Scouting for Blister Rust

This project is summarized and reported in Part VII, page 84.

FINANCIAL STATEMENTS

The 1944 calendar year control program was carried on in the Pacific Coast Region from regular Congressional appropriations to the Bureau and cooperating Federal agencies together with the State of California and private cooperators' cash contributions.

In financial table 1 are shown the allotments made to the cooperating Federal agencies for expenditure in the Pacific Coast Region for the 1944 and 1945 fiscal years. Financial table 2 shows the expenditures by the same agencies for the 1944 calendar year.

Financial table 3 pertains only to expenditures of this Bureau and shows expenditures by project and appropriation symbol, and by State separated to show amounts expended for salaries and wages, and for other expenses. The amounts shown as salaries are the net payments after deductions for subsistence from the earnings of the employees. The cost of subsistence supplies is included under "Expenses". Also included as a part of this table are the expenditures of the Developmental and Investigative Unit headquartered at Berkeley, whose bookkeeping records are maintained and vouchers processed through the Oakland Regional Office. The expenditures of the Berkeley Unit include the salaries, expenses, and operating costs of two of its personnel headquartered at the Northwestern Regional Office at Spokane, Washington and one stationed at Moscow, Idaho.

Financial table 4 (also shown as table 7, page 61) shows the amounts contributed in cash by the State of California and the three cooperating lumber companies for ribes eradication in California and the amounts allocated by the Federal Government for the purpose of matching such contributions under the provisions of the "Lea Act", Public Law 486, 76th Congress. This table also shows the accumulative expenditures from "Lea Act" funds from July 1, 1941 through December 31, 1943; such expenditures during the period January 1 to December 31, 1944, and the balances available for expenditure as of January 1, 1945. The available Federal funds must be expended prior to July 1, 1945; the cash contributions from State and private sources remain available until expended.

Omnibus tables 3 and 7A present a summary of expenditures for 1944 and a summary of expenditures for the entire period of operation for all cooperating agencies and for emergency fund programs as well as regular fund programs.

TABLE 1

FISCAL YEAR ALLOTMENTS FROM WHICH FEDERAL EXPENDITURES WERE MADE
IN THE PACIFIC COAST REGION DURING THE CALENDAR YEAR 1944

ALL REGULAR FUNDS

<u>Agency</u>	<u>Fiscal Year 1944</u>	<u>Fiscal Year 1945*</u>
Bureau of Entomology and Plant Quarantine	\$ 169,020	\$ 165,556
Forest Service, Region 5 (California).	299,000	300,000
Forest Service, Region 6 (Oregon).	77,500	72,500
National Park Service:		
Yosemite National Park	43,550	59,000
Sequoia-Kings Canyon National Park	22,680	39,200
Regional Office	4,928	5,147
Oregon and California Revested Lands Administration	<u>43,620</u>	<u>38,000</u>
Total - Pacific Coast Region	\$ 660,298	\$ 679,403

*Figures in this column represent allotments as they are known as of
December 31, 1944, and are subject to change until June 30, 1945.

TABLE 2

FEDERAL EXPENDITURES IN THE PACIFIC COAST REGION FOR CALENDAR YEAR 1944

REGULAR FUNDS

Agency	California		Oregon		Region
	Fiscal Year 1944 1/1/44-6/30/44	Fiscal Year 1945 7/1/44-12/31/44	Fiscal Year 1944 1/1/44-6/30/44	Fiscal Year 1945 7/1/44-12/31/44	
Bureau of Entomology and Plant Quarantine	\$ 59,865	\$ 113,608	\$ 4,189	\$ 4,774	\$ 182,436
Forest Service, Region V . .	136,952	219,699			356,651
Forest Service, Region VI . .			27,149	39,658	66,807
National Park Service					
Yosemite National Park. . .	11,655	33,895			45,550
Sequoia-Kings Canyon National Park	5,876	24,209			30,085
Regional Office	2,421	2,581			5,002
Oregon and California Revested Lands Administration			11,758	15,459	27,217
Total - Pacific Coast Region	\$ 216,769	\$ 393,992	\$ 43,096	\$ 59,891	\$ 713,748

TABLE 3

CLASSIFIED BUREAU EXPENDITURES BY STATE, APPROPRIATION SYMBOL, AND PROJECT

Pacific Coast Region - January 1 to December 31, 1944

Appropriation Symbol Project No.	Fiscal Year 1944 1242245(66).030		Fiscal Year 1945 1252245(66).030		12X8200(13).213*				Total
	3101.14	3103.14	3101.14	3103.14	X2132.14	X2133.14	X2134.14	X2135.14	
California									
Salaries	\$23,455.26	\$5,210.58	\$27,806.31	\$55,897.43	\$49,973.60	\$1,955.10	\$2,032.57	\$2,048.15	\$168,379.00
Expenses	13,591.67	17,607.93	7,637.93	22,266.37	15,314.21	47.90	16.68		76,482.69
Totals	37,046.93	22,818.51	35,444.24	78,163.80	65,287.81	2,003.00	2,049.25	2,048.15	244,861.69
Oregon									
Salaries	3,828.24		4,286.18						8,114.42
Expenses	361.02		487.97						848.99
Totals	4,189.26		4,774.15						8,963.41
Pacific Coast Region									
Salaries	27,283.50	5,210.58	32,092.49	55,897.43	49,973.60	1,955.10	2,032.57	2,048.15	\$176,493.42
Expenses	13,952.69	17,607.93	8,125.90	22,266.37	15,314.21	47.90	16.68		77,331.68
Totals	\$41,236.19	\$22,818.51	\$40,218.39	\$78,163.80	\$65,237.81	\$2,003.00	\$2,049.25	\$2,048.15	\$253,825.10

*Contributed cooperative funds: X2132.14 State of California, Division of Forestry \$50,000; X2133.14 The Diamond Match Company \$2,000; X2134.14 Michigan-California Lumber Company \$2,000; X2135.14 Red River Lumber Company \$2,000.

D & I Unit**

Salaries	\$9,500.37	\$12,999.90							\$22,500.27
Expenses	1,411.54	894.00							2,305.54
Total	\$10,911.91	\$13,893.90							\$24,805.81

**Amounts shown in these columns represent expenditures of the Development and Investigative Unit headquartered at Berkeley from funds allocated directly to that Unit, but whose accounts and vouchers were processed by the Oakland business office.

TABLE 4

STATUS OF COOPERATIVE FUNDS FOR RIBES ERADICATION ON STATE AND PRIVATE LANDS
IN CALIFORNIA - JULY 1, 1941 TO DECEMBER 31, 1944

Cooperative Funds	Accumulative Expenditures 7/1/41 - 12/31/43	Expenditures Calendar Year 1944	Available Balances as of 1/1/45
State & Private Cash Contributions:			
State of California	\$150,000	\$ 65,288	\$ 25,044
Michigan-California Lumber Co.	6,000	2,049	2,000
Red River Lumber Co.*	4,000	2,048	
Diamond Match Co.	6,000	2,003	2,000
Total	\$166,000	\$ 71,388	\$ 29,044
Federal Allotments (Project 3103.14):			
1942 Fiscal Year	\$ 14,625		
1943 Fiscal Year	71,770		
1944 Fiscal Year	86,195	22,819	
1945 Fiscal Year	85,040	78,164	6,876
Total (Project 3103.14)	\$257,630	\$ 100,983	\$ 6,876
Grand Total	\$423,630	\$ 172,371	\$ 35,919

*Red River Lumber Company did not contribute for the 1945 fiscal year.

NOTE: Expenditures in the amount of \$19,031.24 were made during 1944 for emergency fire suppression at the call of the State of California, Division of Forestry and the U. S. Forest Service. Reimbursements were made by these agencies to the Bureau blister rust control funds in the amounts of \$11,401.70 from the State and \$7,629.54 from the Forest Service. These amounts were credited back to the funds from which expended and are a part of the balances shown available for expenditure.

TABLE 5
(Omnibus Table 3)

SUMMARY OF EXPENDITURES - FEDERAL AND COOPERATIVE - 1944

State	Total Federal Funds	Total Cooperative Funds (Direct & Indirect)	Grand Total All Funds	Federal Funds			
				Bureau Entomology & Plant Quarantine		Forest Service	Park Service
				Leadership & Cooperative Coordination (3101)	Ribes Erad. (3103)		
California	\$ 610,761	\$ 81,588	\$ 692,349	\$ 72,491	\$ 100,982	\$ 356,651	\$ 80,637
Oregon	102,987	1,000	103,987	8,963		66,807	27,217
Totals	\$ 713,748	\$ 82,588	\$ 796,336	\$ 81,454	\$ 100,982	\$ 423,458	\$ 80,637

State	Cooperative Funds		
	Direct Aid		Indirect Aid
	State	Private	Total
California	65,288	6,100	71,388
Oregon			
Totals	65,288	6,100	71,388

TABLE 6
(Omnibus Table 7A)

SUMMARY OF ALL EXPENDITURES 1918*-1944 (INCLUSIVE)

(Gross Figures Used)

State	Total Federal Funds		Total Cooperative Funds	Grand Total All Funds	Regular Funds				O & C Revested Lands
	Regular	Emergency			Bureau (BPI & EPQ)	Forest Service	Park Service		
California	\$2,731,515	\$3,449,752	\$446,856	\$6,628,123	\$1,073,407	\$1,368,931	\$289,177		
Oregon	559,256	598,888	185,300	1,343,444	285,453	158,467			\$115,336
Totals	\$3,290,771	\$4,048,640	\$632,156	\$7,971,567	\$1,358,860	\$1,527,398	\$289,177		\$115,336

State	Cooperative Funds			
	Direct Aid		Total	Indirect Aid
	State	Private		
California	\$ 124,956	\$ 12,000	\$ 136,956	\$ 309,900
Oregon				185,300
Totals	\$ 124,956	\$ 12,000	\$ 136,956	\$ 495,200

*No expenditures in the Pacific Coast Region prior to 1923.

REGIONAL SUMMARY TABLES
OF
RIBES ERADICATION AND OF CHECKING

TABLE 1
THE STATUS OF RIBES ERADICATION IN THE PACIFIC COAST REGION AS OF DECEMBER 31, 1944

PART A - CALIFORNIA

Control Operation	Class of Ownership	Control Units		Status of Ribes Eradication									
		Total Acres	Acres Unworked	First Working			Reeradication			Total All Workings			
				Acres Worked	Man Days	Ribes Eradicated	Acres Worked	Man Days	Ribes Eradicated	Acres Worked	Man Days	Ribes Eradicated	
National Forests													
Mendocino	Federal	21,017	21,017										
	Private	15,179	15,179										
	State	48	48										
	Total -	36,244	36,244										
Trinity	Federal	122,575	122,575										
	Private	40,283	40,283										
	State	2,088	2,088										
	Total -	164,946	164,946										
Klamath	Federal	19,850	13,883	5,767	6,038	955,668	1,036	790	39,934	6,803	6,828	995,602	
	Private	26,850	12,674	14,176	15,111	1,146,806	654	580	7,995	14,830	15,691	1,154,802	
	Total -	46,500	26,557	19,943	21,149	2,102,474	1,690	1,370	47,930	21,633	22,519	2,150,404	
Shasta	Federal	3,611	3,611										
	Private	74,151	74,151										
	Total -	77,762	77,762										
Lassen	Federal	69,172	59,307	9,865	5,974	1,019,594	1,997	552	35,682	11,862	6,526	1,055,276	
	Private	243,921	204,569	39,352	26,066	3,799,546	11,622	4,132	492,469	50,974	30,258	4,292,015	
	State	1,055	1,055										
	Total -	314,148	264,931	49,217	32,040	4,819,140	13,619	4,744	528,151	62,836	36,784	5,347,291	
Plumas	Federal	186,585	102,549	84,036	60,453	11,517,796	42,971	25,685	2,714,234	127,007	86,138	14,232,090	
	Private	125,630	55,159	70,471	52,435	10,345,613	42,852	24,436	3,238,003	113,323	76,871	13,583,616	
	State	360	320	40	21	4,620				40	21	4,620	
	Total -	312,575	158,028	154,547	112,909	21,868,029	85,823	50,121	5,952,297	240,370	163,030	27,820,326	
Tahoe	Federal	19,325	19,325										
	Private	19,983	19,983										
	Total -	39,908	39,908										
Eldorado	Federal	117,725	51,102	66,623	33,159	9,519,905	37,298	22,751	1,511,581	103,921	55,910	11,031,485	
	Private	126,507	40,924	85,583	52,344	13,159,128	45,149	25,424	2,169,198	130,732	77,768	15,328,326	
	State	2,642	40	2,602	1,634	310,891	1,103	383	18,706	3,705	2,017	329,597	
	Total -	246,874	92,066	154,808	87,137	22,989,924	83,550	48,558	3,699,485	238,358	135,695	26,689,409	
Stanislaus	Federal	105,691	29,907	76,784	32,721	8,024,289	76,157	33,709	6,490,940	152,941	66,430	14,515,229	
	Private	122,526	16,800	105,726	52,386	17,509,511	57,024	28,717	3,032,403	162,750	81,103	20,541,914	
	State	407	407	129	16,768					407	129	16,768	
	Total -	229,624	46,707	182,917	85,236	25,550,568	133,181	62,426	9,523,343	316,098	147,662	35,073,911	
Sierra	Federal	173,391	126,686	46,705	88,169	18,133,056	35,459	26,774	9,080,417	82,164	114,943	27,213,473	
	Private	49,082	32,926	16,156	24,382	5,708,223	6,785	4,185	870,735	22,941	28,567	6,578,958	
	State	40	40										
	Total -	222,513	159,662	62,861	112,551	23,841,279	42,244	30,959	9,951,152	105,105	143,510	33,792,431	
Sequoia	Federal	43,930	43,930										
	Private	18,880	18,880										
	Total -	62,810	62,810										
TOTAL ALL NATIONAL FORESTS	Federal	884,272	594,492	289,780	226,514	49,170,308	194,918	110,261	19,872,848	484,698	336,775	69,043,156	
	Private	862,992	531,528	331,464	222,724	51,668,227	164,086	87,534	9,810,804	495,550	310,258	61,479,631	
	State	6,640	3,591	3,049	1,784	332,279	1,103	383	18,706	4,152	2,167	350,885	
	Total -	1,753,904	1,129,611	624,293	451,022	101,171,414	360,107	198,178	29,702,358	984,400	649,200	130,873,772	
National Parks													
Lassen Volcanic	Federal	17,792	4,042	13,750	5,215	700,361	1,960	1,074	98,480	15,710	6,289	798,841	
	Private	140		140	55	14,977	15	6	738	155	61	15,715	
	Total -	17,932	4,042	13,890	5,270	715,338	1,975	1,080	99,218	15,865	6,350	814,556	
Yosemite	Federal	143,790	86,227	57,563	87,174	12,700,266	14,150	18,441	2,878,297	71,713	105,615	15,578,563	
	Private	2,510	2,510										
	Total -	146,300	88,737	57,563	87,174	12,700,266	14,150	18,441	2,878,297	71,713	105,615	15,578,563	
Kings Canyon	Federal	22,430	19,189	3,241	5,132	836,010	1,032	1,284	155,409	4,273	6,416	991,419	
Sequoia	Federal	99,900	88,940	10,960	11,118	1,435,281				10,960	11,118	1,435,281	
TOTAL ALL NATIONAL PARKS	Federal	283,912	198,398	85,514	108,639	15,671,918	17,142	20,799	3,132,186	102,666	129,438	18,804,104	
	Private	2,650	2,510	140	55	14,977	15	6	738	155	61	15,715	
	Total -	286,562	200,908	85,654	108,694	15,686,895	17,157	20,805	3,132,924	102,811	129,499	18,819,819	
State Parks													
Latour	Private	1,200	1,200										
	State	1,160	1,160										
	Total -	2,360	2,360										
Calaveras Big Trees	Private	120		120	21	3,260	75	20	722	195	41	3,982	
	State	1,973	225	1,748	1,318	185,001	1,265	472	26,595	3,013	1,790	211,596	
	Total -	2,093	225	1,868	1,339	188,261	1,340	492	27,317	3,208	1,831	215,578	
TOTAL ALL STATE PARKS	Private	1,320	1,200	120	21	3,260	75	20	722	195	41	3,982	
	State	3,133	1,385	1,748	1,318	185,001	1,265	472	26,595	3,013	1,790	211,596	
	Total -	4,453	2,585	1,868	1,339	188,261	1,340	492	27,317	3,208	1,831	215,578	
Totale For California													
TOTAL ALL CONTROL OPERATIONS CALIFORNIA	Federal	1,168,184	792,890	375,294	335,153	64,842,226	212,060	131,060	23,005,034	587,354	466,213	87,847,260	
	Private	866,962	535,238	331,724	222,800	51,687,064	164,176	87,560	9,812,264	495,900	310,360	61,499,328	
	State	9,773	4,976	4,797	3,102	517,280	2,368	855	45,301	7,165	3,957	562,581	
	Total -	2,044,919	1,333,104	711,815	561,055	117,046,570	378,604	219,475	32,862,599	1,090,419	780,530	149,909,169	

TABLE 1 (Continued)
THE STATUS OF RIBES ERADICATION IN THE PACIFIC COAST REGION AS OF DECEMBER 31, 1944

PART B - OREGON

Control Operation	Class of Ownership*	Control Units		Status of Ribes Eradication								
		Total Acres	Acres Unworked	First Working			Reeradication			Total All Workings		
				Acres Worked	Man Days	Ribes Eradicated	Acres Worked	Man Days	Ribes Eradicated	Acres Worked	Man Days	Ribes Eradicated
National Forests												
Klamath	National Forest	9,031	5,292	3,739	4,607	419,719				3,739	4,607	419,719
	O & C	4,573	4,573									
	Total -	13,604	9,865	3,739	4,607	419,719				3,739	4,607	419,719
	Private	1,552	723	829	1,882	113,810				829	1,882	113,810
	Total -	15,156	10,588	4,568	6,489	533,529				4,568	6,489	533,529
Rogue River	National Forest	87,491	21,586	65,905	39,607	14,624,266	29,297	11,681	1,196,888	95,202	51,288	15,821,154
	O & C	17,350	10,572	6,778	2,207	274,983				6,778	2,207	274,983
	Total -	104,841	32,158	72,683	41,814	14,899,249	29,297	11,681	1,196,888	101,980	53,495	16,096,137
	Private	79,010	6,525	72,485	8,156	1,209,538	13,232	2,378	205,311	85,717	10,534	1,414,909
	Total -	183,851	38,683	145,168	49,970	16,108,847	42,529	14,059	1,402,199	187,697	64,029	17,511,046
Siskiyou	National Forest	67,572	48,455	19,117	6,711	353,384	36	31	2,814	19,153	6,742	356,198
	O & C	101,460	59,572	31,888	8,125	452,882	90	22	1,235	31,978	8,147	454,117
	Total -	169,032	108,027	51,005	14,836	806,266	126	53	4,049	51,131	14,889	810,315
	Private	77,347	43,256	34,091	5,715	504,579				34,091	5,715	504,579
	State	668	368	300	43	8,328				300	43	8,328
	Total -	247,047	161,651	85,396	20,594	1,319,173	126	53	4,049	85,222	20,647	1,323,222
Umpqua**	National Forest	60,353	60,353									
	O & C	6,158	6,158									
	Total -	66,511	66,511									
	Private	8,266	8,266									
	State	320	320									
	Total -	75,097	75,097									
TOTAL ALL NATIONAL FORESTS	National Forest	224,447	135,686	88,761	50,925	15,397,369	29,333	11,712	1,199,702	118,094	62,637	16,597,071
	O & C	129,541	90,875	38,666	10,332	727,865	90	22	1,235	38,756	10,354	729,100
	Total -	353,988	226,561	127,427	61,257	16,125,234	29,423	11,734	1,200,937	156,850	72,991	17,326,171
	Private	166,175	58,770	107,405	15,753	1,827,987	13,232	2,378	205,311	120,637	18,131	2,033,298
	State	988	688	300	43	8,328				300	43	8,328
	Total -	521,151	286,019	235,132	77,053	17,961,549	42,655	14,112	1,406,248	277,487	91,165	19,367,797
National Parks												
Crater Lake	Federal	3,782	150	3,632	412	130,162	350	81	13,430	3,982	493	143,592
Nursery Sanitation												
McDonald State Forest (Clark-McNary Nursery)	Private	418		418	178	2,547				418	178	2,547
	State	462	50	412	174	2,472				412	174	2,472
	Total -	880	50	830	352	5,019				830	352	5,019
O & C (McKinley Nursery)	O & C	168	58	110	162	5,462				110	162	5,462
	Private	132	92	40	111	2,877				40	111	2,877
	Total -	300	150	150	273	8,339				150	273	8,339
TOTAL ALL NURSERIES	O & C	168	58	110	162	5,462				110	162	5,462
	Private	550	92	458	289	5,424				458	289	5,424
	Total -	718	150	568	451	10,886				568	451	10,886
Mt. Hebo White Pine Plantation												
Siuslaw National Forest	Federal	680		680	373	124,744	212	228	29,957	892	601	154,701
Totals For Oregon												
TOTAL ALL CONTROL OPERATIONS OREGON	Federal	358,618	226,769	131,249	62,204	16,385,602	29,985	12,043	1,244,324	161,834	74,247	17,629,926
	Private	166,725	58,862	107,863	16,042	1,833,411	13,232	2,378	205,311	121,095	18,420	2,038,722
	State	1,450	738	712	217	10,800				712	217	10,800
	Total -	526,793	286,369	240,824	78,463	18,229,813	43,217	14,421	1,449,635	283,641	92,884	19,679,448

*Ownership as of February 15, 1939.

**Ownership of 10,128 acres of federal land controversial between the United States Forest Service and the Oregon and California Revested Lands Administration. In these computations this acreage classed as National Forest land.

PART C - TOTALS FOR THE PACIFIC COAST REGION

CALIFORNIA AND OREGON	Federal	1,526,832	1,019,559	507,143	197,357	81,227,828	242,045	143,103	24,249,358	749,188	540,460	105,477,185
	Private	1,033,687	594,100	439,587	238,842	53,550,475	177,408	89,938	10,017,575	616,977	328,780	63,538,050
	State	11,223	5,714	5,509	3,319	528,080	2,368	855	45,301	7,877	4,174	573,381
	Total -	2,571,742	1,619,473	952,239	439,518	135,306,383	421,821	233,896	34,312,234	1,374,060	873,414	169,588,616

TABLE 2

SUMMARY OF RIBES ERADICATION IN THE PACIFIC COAST REGION - 1944

Operation	Class of Work	Acres Worked	8-Hour Man Days	Ribes Eradicated
California				
Klamath National Forest	Initial	4,489	7,501	948,609
	Reeradication	1,690	1,370	47,930
	Total	6,179	8,871	996,539
Lassen National Forest	Initial	1,723	2,193	280,824
	Reeradication	8,149	13,009	2,692,997
	Total	4,429	2,483	563,688
Plumas National Forest	Initial	12,578	15,492	3,256,685
	Reeradication	1,949	1,932	201,869
	Total	7,846	3,173	252,740
Eldorado National Forest	Initial	9,795	5,105	454,609
	Reeradication	410	853	60,514
	Total	5,005	3,623	572,117
Stanislaus National Forest	Initial	5,415	4,476	632,631
	Reeradication	2,483	3,297	567,758
	Total	16,720	25,488	4,184,813
Sierra National Forest	Initial	21,458	13,946	2,004,233
	Reeradication	38,178	39,434	6,189,046
	Total	43	1,351	310,870
NATIONAL FOREST TOTALS	Initial	3,216	3,233	249,970
	Reeradication	3,259	4,584	560,840
	Total	1,032	1,284	155,409
Yosemite National Park	Initial	1,080	2,037	205,796
	Reeradication	1,123	3,388	516,666
	Total	4,248	4,517	405,379
Kings Canyon Nat'l Park	Initial	5,371	7,905	922,045
	Reeradication	17,843	28,876	4,701,479
	Total	25,706	18,463	2,409,612
Sequoia National Park	Initial	43,549	47,339	7,111,091
	Reeradication			
	Total			
NATIONAL PARK TOTALS				
CALIFORNIA TOTALS	Initial	17,843	28,876	4,701,479
	Reeradication	25,706	18,463	2,409,612
	Total	43,549	47,339	7,111,091
Oregon				
Rogue River National Forest	Initial	2,949	1,560	122,548
	Reeradication	4,571	2,300	112,828
	Total	7,520	3,860	235,376
Siskiyou National Forest	Initial	2,593	1,904	46,516
	Reeradication	126	53	4,049
	Total	2,719	1,957	50,565
OREGON TOTALS	Initial	5,542	3,464	169,064
	Reeradication	4,697	2,353	116,877
	Total	10,239	5,817	285,941
Pacific Coast Region				
CALIFORNIA AND OREGON	Initial	23,385	32,340	4,870,543
	Reeradication	30,403	20,816	2,526,489
	Total	53,788	53,156	7,397,032

TABLE 3
SUMMARY OF RIBES ERADICATION BY AGENCY AND BY LAND OWNERSHIP IN THE PACIFIC COAST REGION - 1944

Work Agency	Acres		Per Acre Worked	6-Hour Man Days		Total Ribes Eradicated		Ownership Status										Acres Ribes-Free At Re- eradication				
								Federal					Private									
	Worked	Blocked Out		Total	6-Hour Man Days	Total Ribes Eradicated		Acres Covered					6-Hour Man Days					Total	Private			
								Federal				Forest Service	Park Service	O & C	Total	Forest Service	Park Service			O & C	Total	
								Forest	Park	Service	O & C											Forest
Initial																						
California:																						
B.E.P.O.	8,873			8,873	12,398	2,088,618	1.40	235	2,432			3,083	9,315				640,254	1,446,364				
Forest Service	7,847			7,847	13,090	2,096,195	1.67	267	4,577			7,103	5,987				1,343,932	752,263				
Park Service	1,123			1,123	3,388	516,666	1.02	460	1,123			3,388					516,666					
Subtotal	17,843			17,843	28,876	4,701,473	1.52	263	7,009	1,123		13,574	15,302				2,500,852	2,200,627				
Oregon:																						
Forest Service	1,732	1,341		3,073	2,334	73,666	1.35	43	2,347			509	2,136	198			69,371	4,235				
O & C Admin.	1,854	615		2,469	1,130	95,398	0.61	51	694			377	753				10,912	64,386				
Subtotal	3,586	1,956		5,542	3,464	169,064	0.97	47	2,347			886	2,889	198			80,283	108,771				
Total	21,429	1,956		23,385	32,340	4,870,537	1.51	227	9,356	1,123		14,460	16,253				12,601,135	2,289,408				
Reeradication																						
California:																						
B.E.P.O.	2,736			2,736	1,398	100,210	0.51	37	1,112			524	574				29,984	70,226	1,100			
Forest Service	18,722			18,722	12,548	1,904,023	0.67	102	9,261			8,343	4,205				1,274,836	623,187	1,882			
Park Service	4,248			4,248	4,517	405,379	1.06	95	4,248			4,517					405,379					
Subtotal	25,706			25,706	18,463	2,409,612	0.72	94	10,373	4,248		13,164	5,079				1,710,139	693,413	4,982			
Oregon:																						
Forest Service	4,571			4,571	2,300	112,828	0.50	25	4,006			2,010	290				83,042	29,786				
O & C Admin.	1,26			1,26	53	4,049	0.42	32	36			31					2,814					
Subtotal	4,697			4,697	2,353	116,877	0.50	25	4,042			2,041	290				85,856	29,786				
Total	30,403			30,403	20,816	2,526,489	0.68	83	14,415	4,248		15,447	5,369				1,797,290	723,199	4,982			
All Forcible																						
California:																						
B.E.P.O.	11,609			11,609	13,796	2,188,828	1.19	189	3,444			3,607	10,183				670,238	1,516,590	3,100			
Forest Service	26,569			26,569	29,538	4,007,218	0.96	151	13,838			13,446	10,192				2,618,768	1,361,950	1,882			
Park Service	5,371			5,371	7,985	922,045	1.47	172	5,371			7,905					922,045					
Subtotal	43,549			43,549	49,319	7,111,091	1.59	165	22,753	5,371		26,958	20,381				4,211,051	2,900,040	4,982			
Oregon:																						
Forest Service	6,303	1,341		7,644	6,334	186,404	0.74	70	6,353			509	4,146	488			140,715	74,087				
O & C Admin.	1,960	615		2,595	1,163	99,107	0.60	50	784			399	1,430				32,119	64,386				
Subtotal	8,263	1,956		10,258	7,497	285,511	0.70	75	6,389			908	5,576	488			172,834	138,473				
Total	51,812	1,956		53,768	56,816	7,396,602	1.03	143	29,172	5,371		32,721	25,957				4,384,125	2,998,607	4,982			

TABLE 4

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP AND NUMBER OF WORKING IN THE PACIFIC COAST REGION IN 1944

Land Ownership	Status of Ribes Eradication											
	First Working			Second Working			Third Working			Fourth Working		
	Acres Worked	8-Hour Men	Ribes Eradicated	Acres Worked	8-Hour Men	Ribes Eradicated	Acres Worked	8-Hour Men	Ribes Eradicated	Acres Worked	8-Hour Men	Ribes Eradicated
California												
National Forest	7,009	10,186	1,984,186	4,188	4,005	408,523	5,865	4,687	899,841	320	175	36,466
National Park	1,123	3,388	516,666	4,248	4,517	405,379						
Subtotals - Federal	8,132	13,574	2,500,852	8,436	8,522	813,902	5,865	4,687	899,841	320	175	36,466
Private	9,711	15,302	2,800,627	3,043	1,774	159,459	7,387	2,997	486,647	655	108	43,607
Totals	17,843	28,876	5,301,479	11,479	10,296	973,361	13,252	7,684	1,386,488	975	283	80,073
Oregon												
National Forest	2,347	1,627	57,673	1,634	880	29,662	1,845	874	53,619	563	287	2,575
O & C Revested Lands Admin.	1,180	886	42,610	90	22	1,235						
Subtotals - Federal	3,527	2,513	100,283	1,724	902	30,897	1,845	874	53,619	563	287	2,575
Private	2,015	951	68,781	385	199	13,968	1,805	91	15,818	2,580	1,241	96,587
Totals	5,542	3,464	169,064	2,109	1,101	44,865	3,650	965	69,437	563	287	2,575
Pacific Coast Region												
National Forest	9,356	11,813	2,041,859	5,822	4,885	438,893	7,710	5,561	913,460	883	462	39,031
National Park	1,123	3,388	516,666	4,248	4,517	405,379						
O & C Revested Lands Admin.	1,180	886	42,610	90	22	1,235						
Subtotals - Federal	11,659	16,087	2,601,135	10,160	9,424	845,492	7,710	5,561	913,460	883	462	39,031
Private	11,720	16,253	2,800,627	3,043	1,774	159,459	7,387	2,997	486,647	655	108	43,607
Totals	23,379	32,340	5,401,762	13,203	11,197	1,004,951	15,097	8,558	1,400,107	1,538	570	82,638

TABLE 5

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP AND NUMBER OF WORKING IN THE PACIFIC COAST REGION 1925-1944

Land Ownership	Status of Ribes Eradication											
	First Working			Second Working			Third Working			Fourth Working		
	Acres Worked	8-Hour Men	Ribes Eradicated	Acres Worked	8-Hour Men	Ribes Eradicated	Acres Worked	8-Hour Men	Ribes Eradicated	Acres Worked	8-Hour Men	Ribes Eradicated
California												
National Forest	269,780	226,514	49,170,308	148,791	43,171	14,594,715	36,702	23,259	4,904,560	6,197	2,956	216,888
National Park	85,514	108,659	15,671,918	17,142	20,799	3,132,166						
Subtotals - Federal	379,204	335,173	64,842,226	165,933	103,970	17,726,881	36,702	23,259	4,904,560	6,197	2,956	216,888
Private	331,724	222,862	51,687,064	140,571	76,094	8,263,155	21,578	8,490	1,461,847	1,337	511	61,095
State	44,151	3,162	11,046,570	5,817	11	1,046,570	58,435	32,200	6,390,681	7,534	3,487	277,943
Totals	711,655	561,095	117,574,860	309,111	182,875	26,134,710	95,137	55,459	11,757,241	9,671	3,948	345,926
Oregon												
National Forest	89,441	51,238	15,522,113	24,219	8,216	1,032,418	4,710	3,429	194,500	576	295	2,641
National Park	38,572	10,412	10,412	10,412	3,112	3,112						
O & C Revested Lands Admin.	38,572	10,412	10,412	10,412	3,112	3,112						
Subtotals - Federal	131,604	62,004	16,185,622	24,624	8,319	1,047,033	4,710	3,429	194,500	576	295	2,641
Private	107,863	16,042	1,631,411	12,577	2,452	186,499	642	318	15,746	13	66	66
State	712	217	10,800									
Totals	240,424	78,463	18,229,833	37,201	10,771	1,233,532	5,352	3,747	213,246	589	303	2,707
Pacific Coast Region												
National Forest	379,221	277,812	64,592,421	173,030	91,387	15,727,133	41,432	26,688	5,099,250	6,773	3,251	219,529
National Park	89,146	109,061	15,602,060	17,462	20,860	3,145,616						
O & C Revested Lands Admin.	89,146	109,061	15,602,060	17,462	20,860	3,145,616						
Subtotals - Federal	357,513	397,935	95,796,541	190,492	112,247	18,872,964	41,432	26,688	5,099,250	6,773	3,251	219,529
Private	439,587	238,842	51,530,475	154,848	80,146	8,450,284	22,220	9,593	1,350,519	519	290	55
State	5,509	3,319	228,080	2,213	814	44,114	155	41	1,487	13	66	66
Totals	802,609	639,518	147,555,196	347,553	193,247	27,367,362	63,807	36,324	6,500,283	7,305	3,548	285

TABLE 6

THE DISTRIBUTION OF CAMPS IN THE PACIFIC COAST REGION DURING 1944

Control Operation	Agency and Fund	County	Number and Average Size of Camps	Approximate Period of Operation	Location
Oregon					
Siskiyou	FS - Reg.	Josephine	1 - 60	June 6 - Aug. 31	Oregon Caves
Rogue	FS - Reg.	Jackson	1 - 100	June 5 - Aug. 31	Union Creek
	O&C - Reg.	Jackson	1 - 35	June 7 - Aug. 31	Pinehurst
California					
Klamath	FS - Reg.	Siskiyou	3 - 50	May 15 - Oct. 10	Cinnabar Springs
Lassen	EQ - Reg.	Plumas	1 - 45	June 26 - Aug. 26	Beaver Creek - Hungry Creek
	EQ - Reg.	Butte	1 - 45	June 26 - Aug. 28	Humbug Rag Dump
Plumas	FS - Reg.	Plumas	2 - 40	May 15 - Sept. 31	Mooreville Ridge & Canyon Dam
	FS - Reg.	Plumas	1 - 30	June 6 - Sept. 6	Meadow Valley
	FS - Reg.	Sierra	1 - 70	June 15 - Aug. 31	Scales
	EQ - Reg.	Plumas	4 - 50	June 15 - Aug. 31	Camel Peak - Cascade
Eldorado	EQ - Reg.	Yuba	1 - 50	June 20 - Sept. 6	Walter's Mine - American House
	FS - Reg.	Eldorado	1 - 50	June 15 - Aug. 31	Frosty Hollow
Stanislaus	EQ - Reg.	Eldorado	2 - 50	June 17 - Aug. 31	Pi Pi
	FS - Reg.	Tuolumne	4 - 40	June 15 - Aug. 31	Davis Cabin & Butcher's Corral Thompson Meadows - Jawbone Carl Inn - Camp 17
Sierra	FS - Reg.	Madera	2 - 50	June 12 - Sept. 9	Summit - Soquel
Yosemite	NPS - Reg.	Mariposa	1 - 60	June 23 - Aug. 31	Crane Flat
	NPS - Reg.	Mariposa	1 - 40	June 6 - Aug. 11	Wawona
Kings Canyon	NPS - Reg.	Fresno	1 - 35	June 19 - Aug. 17	Cedar Springs
Sequoia	NPS - Reg.	Tulare	1 - 45	June 13 - Aug. 31	Red Fir

TABLE 7

SUMMARY OF REGULAR, ADVANCE, AND POST CHECKING IN THE PACIFIC COAST REGION - 1944

Operation	Regular Check			Advance Check			Post Check		
	Acres Covered By Final Check	Per cent Of Check	Man Days	Acres Covered	Per cent Of Check	Man Days	Acres Covered	Per cent Of Check	Man Days
Oregon									
Rogue River	6,990	5.6	132 4/8	2,660	4.7	47 6/8	640	4.8	10 2/8
Siskiyou	1,193	4.0	33 3/8	3,419	4.9	79 3/8	2,429	5.6	46 2/8
Totals	8,183	5.4	165 7/8	6,079	4.8	127 1/8	3,069	4.6	56 4/8
California									
Klamath	3,577	4.7	96 7/8	2,945	3.2	46 2/8	10,483	5.1	199
Plumas	3,351	4.2	48 6/8	9,899	2.5	141	12,703	2.7	175 4/8
Stanislaus	775	2.7	16 5/8	-	-	-	12,560	2.7	174 2/8
Eldorado	1,210	2.6	14	-	-	-	18,897	3.4	282 2/8
Sierra	1,850	5.1	55 4/8	-	-	-	660	4.7	17 4/8
Yosemite N. P.	3,007	5.0	60 3/8	-	-	-	1,873	3.6	34 5/8
Sequoia N. P.	1,931	4.5	40 6/8	904	2.5	10 2/8	-	-	-
Totals	15,701	4.4	332 7/8	13,748	2.7	197 4/8	57,176	3.4	883 1/8
Pacific Coast Region									
Totals	23,884	4.7	498 6/8	19,827	3.3	324 5/8	60,245	3.5	939 5/8

TABLE 8

ANALYSIS OF CHECKING COST AND PRODUCTION IN THE PACIFIC COAST REGION - 1944

Operation	Class Of Check	Man Days		Strip Acres	Strip Acres Per Checker Man Day	Strip Acres Per Checker Field Man Day	Total Cost	Cost Per Acre Basis Acres Covered By Check	Cost Per Strip Acre
		Number	Per cent Of Total Checker Man Days						
Oregon	Regular	165 7/8	42.3	446.8	2.9	3.5	\$ 1,401.50	\$ 0.171	\$ 3.14
	Advance	127 1/8	32.4	292.2	2.5	3.0	1,074.08	0.177	3.68
	Post	56 4/8	14.4	167.8	3.2	3.8	477.38	0.156	2.84
	All	349 4/8	89.1	906.8	2.8	3.3	2,952.96	0.170	3.26
California	Regular	332 7/8	14.8	742.6	2.3	3.1	2,815.70	0.179	3.79
	Advance	197 4/8	8.8	365.0	2.0	2.3	1,675.95	0.122	4.59
	Post	883 1/8	39.3	1,946.6	2.3	2.7	7,433.56	0.130	3.82
	All	1,413 4/8	62.9	3,054.2	2.2	2.8	11,925.21	0.138	3.91
Totals Pacific Coast Region	Regular	498 6/8	18.9	1,189.4	2.5	3.2	4,217.20	0.177	3.55
	Advance	324 5/8	12.3	657.2	2.2	2.6	2,750.03	0.139	4.18
	Post	939 5/8	35.6	2,114.4	2.3	2.8	7,910.94	0.131	3.74
	All	1,763	66.8	3,961.0	2.3	2.9	\$14,878.17	\$ 0.143	\$ 3.76

TABLE 9
ANALYSIS OF CHECKING TIME DEVOTED TO OTHER ACTIVITIES IN THE PACIFIC COAST REGION - 1944

Operation	Eradication		Pine Count		Section Line Control		Fire		Total		Per Cent Of Total Checker Man Days
	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost	
Oregon	3	\$ 25.35	4 1/8	\$ 34.85	19 5/8	\$ 165.83	16	\$ 135.20	42 6/8	\$ 361.23	12.2
California	492 1/8	4,169.81	42 7/8	364.20	188 3/8	1,591.31	111 7/8	944.11	835 2/8	7,069.43	37.1
Totals	495 1/8	\$4,195.16	47	\$ 399.05	208	\$1,757.14	127 7/8	\$1,079.31	878	\$7,430.66	33.2

OMNIBUS TABLES

The Omnibus Tables are to be found on the pages following with the exception of certain ones which have been placed in relevant sections of the report. These are:

Part II - Pages 16 and 17:

- Omnibus Table 3 - Summary of Expenditures - Federal and Cooperative - 1944
- Omnibus Table 7A - Summary of All Expenditures 1918*-1944 (Inclusive)

Part III - Pages 59 and 60:

- Omnibus Table 2, Sheet 7 - Summary of Ribes Eradication on State and Private Lands in 1944
- Omnibus Table 2A, Sheet 7 - Summary of Ribes Eradication on State and Private Lands 1918-1944 (Inclusive)

Part IV - Pages 69 and 70:

- Omnibus Table 2, Sheet 2 - Summary of Ribes Eradication on National Forest Land in 1944
- Omnibus Table 2A, Sheet 2 - Summary of Ribes Eradication on National Forest Land 1918-1944 (Inclusive)

Part V - Page 78:

- Omnibus Table 2A, Sheet 3 - Summary of Ribes Eradication on National Park Land 1918-1944 (Inclusive)

Part VI - Page 83:

- Omnibus Table 2, Sheet 5 - Summary of Ribes Eradication on O and C Lands, Oregon in 1944
- Omnibus Table 2A, Sheet 5 - Summary of Ribes Eradication on O and C Lands, Oregon 1918-1944 (Inclusive)

CANIBUS TABLE 1

SUMMARY OF RIBES ERADICATION AND OTHER CONTROL WORK BY STATES AND OPERATING AGENCIES IN 1944
PACIFIC COAST REGION

State	Operating Agency	First Working					Second and Other Workings							Acres Second Working Only
		Acres	Ribes Destroyed	Man Days	Per Acre*			Acres	Ribes Destroyed	Man Days	Per Acre*			
					Ribes	Man Days	Cost				Ribes	Man Days	Cost	
California	Bureau	8,873	2,088,618	12,398	235	1.40	\$ 17.46	2,736	100,210	1,398	37	0.51	\$ 6.38	2,736
	Forest Service Park	7,847	2,096,195	13,090	267	1.67	23.21	18,722	1,904,023	12,548	102	0.67	9.32	4,495
	Service	1,123	516,666	3,388	460	3.02	30.78	4,248	405,379	4,517	95	1.06	10.85	4,248
	Totals	17,843	4,701,479	28,876	263	1.62	20.82	25,706	2,409,612	18,463	94	0.72	9.26	11,479
Oregon	Forest Service O & C Admin.	3,073	73,666	2,334	24	0.76	10.95	4,571	112,828	2,300	25	0.50	7.25	1,983
		2,469	95,398	1,130	39	0.46	10.53	126	4,049	53	32	0.42	9.67	126
	Totals	5,542	169,064	3,464	31	0.63	10.76	4,697	116,877	2,353	25	0.50	7.32	2,109
Totals		23,385	4,870,543	32,340	208	1.38	\$ 18.44	30,403	2,526,489	20,816	83	0.68	\$ 8.96	13,588

State	Operating Agency	All Workings						Number of Camps	Number of Employees	All Other Control Work Treatment		
		Acres	Ribes Destroyed	Man Days	Per Acre		Cost			Pines Treated	Man Days	
					Ribes	Man Days						
California	Bureau	11,609	2,188,828	13,796	189	1.19	\$ 14.85	9	475	854	36	
	Forest Service	26,569	4,000,218	25,638	151	0.96	13.42	14	785	4,056	130	
	Park Service	5,371	922,045	7,905	172	1.47	15.01	4	200			
	Totals	43,549	7,111,091	47,339	163	1.09	14.00	27	1,460	4,910	166	
Oregon	Bureau									437	11	
	Forest Service	7,644	186,494	4,634	24	0.61	8.74	2	175	551	48	
	O & C Admin.	2,595	99,447	1,183	38	0.46	10.49	1	45			
	Totals	10,239	285,941	5,817	28	0.57	9.18	3	220	988	59	
Totals		53,788	7,397,032	53,156	138	0.99	\$ 13.08	30	1,680	5,898	225	

*Per acre figures exclude Bureau 3101 funds.

**Maximum number employed on work at peak of season exclusive of permanent personnel.

OMNIBUS TABLE 2, SHEET 1

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIPS IN 1944
PACIFIC COAST REGION

Land Ownership	First Working			Second and Other Workings				All Workings			
	Per Acre		Acres	Acres	Per Acre		Acres Second Working Only	Acres	Per Acre		Man Days
	Ribes	Man Days			Ribes	Man Days			Ribes	Man Days	
National Forest Lands	9,356	218	1.26	14,415	96	0.76	5,822	23,771	144	0.96	
National Park Lands	1,123	460	3.02	4,248	95	1.06	4,248	5,371	172	1.47	
O & C Revested Lands	1,180	36	0.75	90	14	0.24	90	1,270	35	0.71	
Subtotal Federal	11,659	223	1.38	18,753	96	0.82	10,160	30,412	145	1.04	
State & Private Lands	11,726	194	1.39	11,650	63	0.46	3,428	23,376	128	0.92	
Grand Totals	23,385	208	1.38	30,403	83	0.68	13,588	53,788	138	0.99	

OMNIBUS TABLE 2A, SHEET 1

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIPS 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

(Net Figures Used)

Land Ownership	First Workings			Second and Other Workings			All Workings		
	Acres	Per Acre		Acres	Per Acre		Acres	Per Acre	
		Ribes	Man Days		Ribes	Man Days		Ribes	Man Days
National Forest Lands	379,221	171	0.73	224,463	94	0.54	603,684	142	0.66
National Park Lands	89,146	177	1.22	17,492	180	1.19	106,638	178	1.22
O & C Revested Lands	38,776	19	0.27	90	14	0.24	38,866	19	0.27
Subtotal Federal	507,143	160	0.78	242,045	100	0.59	749,188	141	0.72
State & Private Lands	445,096	121	0.54	179,776	56	0.51	624,872	103	0.53
Grand Totals	952,239	142	0.67	421,821	81	0.55	1,374,060	123	0.64

STATUS OF RIBES ERADICATION BY STATES AND OPERATING AGENCIES 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

(Net Figures Used)

State	Operating Agency	White Pine in Control Area Acres	Control Area (White Pine + Prot. Zone) Acres	Initially Worked Acres	Per Cent Initially Worked	Initially Unworked Acres	Maintenance Acres	Per Cent on Main.	Second Working Acres	Third and Other Workings Acres
California	Bureau Forest Service			411,591					116,999	11,673
	Park Service			222,776					175,441	57,814
	Totals	2,044,919	2,044,919	711,815	35	1,333,104	323,746	16	309,117	69,487
Oregon	Bureau Forest Service			203,694					32,668	474
	Park Service			7,733					4,112	5,487
	O & C Admin.			3,632					350	
Pacific Coast Region	Totals	526,793	526,793	240,424	46	286,369	127,265	24	37,256	5,961
	Bureau Forest Service			615,285					149,667	12,147
	Park Service			230,509					179,553	63,301
Pacific Coast Region	O & C Admin.			81,080					17,027	
	Totals	2,571,712	2,571,712	952,239	37	1,619,473	451,011	18	346,373	75,448

OMNIBUS TABLE 1A, SHEET 2

STATUS OF RIBES ERADICATION BY LAND OWNERSHIP 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

(Net Figures Used)

Land Ownership	White Pine in Control Area Acres	Control Area (White Pine + Prot. Zone) Acres	Initially Worked Acres	Per Cent Initially Worked	Initially Unworked Acres	Mainte- nance Acres	Per Cent on Main.	Second Working Acres	Third and Other Workings Acres
National Forest Lands	1,109,399	1,109,399	379,221	34	730,178	179,139	16	173,030	51,433
Department of Interior National Park Lands	287,694	287,694	89,146	31	198,548	40,804	14	17,492	
O & C Revested Lands	129,709	129,709	38,776	30	90,933	20,528	16	90	
Subtotal Interior	417,403	417,403	127,922	31	289,481	61,332	15	17,582	
Subtotal All Federal Lands	1,526,802	1,526,802	507,143	33	1,019,659	240,471	16	190,612	51,433
State & Private Lands	1,044,910	1,044,910	445,096	43	599,814	210,540	20	155,761	24,015
Grand Totals	2,571,712	2,571,712	952,239	37	1,619,473	451,011	18	346,373	75,448

OMNIBUS TABLE 3A

SUMMARY OF RIBES ERADICATION BY STATES, OPERATING AGENCIES, AND WORKINGS 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

(Gross Figures Used)

State	Operating Agency	First Working*				Second Working				Third and Other Workings				All Workings				Per Acre	
		Acres	Ribes Destroyed	Man Days		Acres	Ribes Destroyed	Man Days		Acres	Ribes Destroyed	Man Days		Acres	Ribes Destroyed	Man Days	Ribes	Man Days	
California	Bureau	411,591	66,375,649	263,462		116,999	8,503,206	54,173		11,673	466,992	4,333		540,263	75,345,847	321,968	139	0.60	
	Forest Service	222,776	36,695,877	194,476		175,441	14,797,297	108,226		57,814	6,260,837	32,264		456,031	57,754,011	334,966	127	0.73	
	Park Service	77,448	13,975,044	103,117		16,677	2,834,267	20,479						94,125	16,809,311	123,596	179	1.31	
	Totals	711,815	117,046,570	561,055		309,117	26,134,770	182,878		69,487	6,727,829	36,597		1,090,419	149,909,169	780,530	137	0.72	
Oregon	Bureau	206,343	17,292,915	65,911		34,190	1,173,037	8,260		718	124,281	594		241,251	18,590,233	74,765	77	0.31	
	Forest Service	7,733	371,443	4,975		4,112	285,754	2,916		5,487	206,940	3,854		17,332	864,137	11,745	50	0.68	
	Park Service	3,632	130,162	412		350	13,430	81						3,982	143,592	493	36	0.12	
	O & C Admin.	25,365	629,585	8,816		126	4,049	53						25,491	633,634	8,869	25	0.35	
Pacific Coast Region	Totals	243,073	18,424,105	80,114		38,778	1,476,270	11,310		6,205	331,221	4,448		288,056	20,231,596	95,872	70	0.33	
	Bureau	617,934	83,668,564	329,373		151,189	9,676,243	62,433		12,391	591,273	4,927		781,514	93,936,080	396,733	120	0.51	
	Forest Service	230,509	37,067,320	199,451		179,553	15,083,051	111,142		63,301	6,467,777	36,118		473,363	58,618,148	346,711	124	0.73	
	Park Service	81,080	14,105,206	103,529		17,027	2,847,697	20,560						98,107	16,952,903	124,089	173	1.26	
Totals	O & C Admin.	25,365	629,585	8,816		126	4,049	53						25,491	633,634	8,869	25	0.35	
	Totals	954,888	135,470,675	641,169		347,895	27,611,040	194,188		75,692	7,059,050	41,045		1,378,475	170,140,765	876,402	123	0.64	

*Includes ribes-free acreage.

OMNIBUS TABLE 4A

SUMMARY OF ALL OTHER CONTROL WORK BY STATES AND OPERATING AGENCIES 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

(Gross Figures Used)

State	Operating Agency	Cultivated Black Currants Destroyed	Treatment		Nursery Sanitation				Number of Nurseries Retaining Protective Zones
			Infected Pines Treated	Man Days	Nurseries Worked	Acres Worked	Ribes Destroyed	Man Days	
California	Bureau	8,621	3,456	147					
	Forest Service		4,056	130	1	42	38	22	1
	Totals	8,621	7,512	277	1	42	38	22	1
Oregon	Bureau	52,202	1,397	66	2	1,856	21,814	771	2
	Forest Service		851	64					
	O & C Admin.				1	150	8,339	273	1
Pacific Coast Region Totals	Totals	52,202	2,248	130	3	2,006	30,153	1,044	3
		60,823	9,760	407	4	2,048	30,191	1,066	4

OMNIBUS TABLE 5A

SUMMARY OF ALL RIBES ERADICATION BY STATES, OPERATING AGENCIES AND PROGRAMS 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

(Gross Figures Used)

State	Operating Agency	Regular and Cooperative			All Emergency Programs			Totals		
		Acres	Ribes	Man Days	Acres	Ribes	Man Days	Acres	Ribes	Man Days
California	Bureau Forest Service Park Service	106,913	8,151,709	46,098	433,350	67,194,138	275,870	540,263	75,345,847	321,968
	Totals	185,474	20,350,986	115,541	270,557	37,403,025	219,425	456,031	57,754,011	334,966
	Bureau Forest Service Park Service	32,649	4,368,269	30,762	61,476	12,441,042	92,834	94,125	16,809,311	123,596
	Totals	325,036	32,870,964	192,401	765,383	117,038,205	588,129	1,090,419	149,909,169	780,530
Oregon	Bureau Forest Service Park Service O & C Admin.	4,174	255,513	2,674	237,077	18,334,720	72,091	241,251	18,590,233	74,765
	Totals	16,567	771,359	11,350	765	92,778	395	17,332	864,137	11,745
	Bureau Forest Service Park Service O & C Admin.				3,982	143,592	493	3,982	143,592	493
	Totals	22,178	439,051	6,645	3,313	194,583	2,224	25,491	633,634	8,869
Pacific Coast Region	Bureau Forest Service Park Service O & C Admin.	42,919	1,465,923	20,669	245,137	18,765,673	75,203	288,056	20,231,596	95,872
	Totals	111,087	8,407,222	48,772	670,427	85,528,858	347,961	781,514	93,936,080	396,733
	Bureau Forest Service Park Service O & C Admin.	202,041	21,122,345	126,891	271,322	37,495,803	219,820	473,363	58,618,148	346,711
	Totals	32,649	4,368,269	30,762	65,458	12,584,634	93,327	98,107	16,952,903	124,089
Pacific Coast Region	Bureau Forest Service Park Service O & C Admin.	22,178	439,051	6,645	3,313	194,583	2,224	25,491	633,634	8,869
	Totals	367,955	34,336,887	213,070	1,010,520	135,803,878	663,332	1,378,475	170,140,765	876,402

OMNIBUS TABLE 6A

SUMMARY OF ALL RIBES ERADICATION ELIMINATED FROM CONTROL AREA
BY STATES AND OPERATING AGENCIES 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

(Gross Figures Used)

State	Operating Agency	First Working			Second Working		
		Acres	Ribes	Man Days	Acres	Ribes	Man Days
Oregon*	Bureau	2,649	194,292	1,651	1,522	242,688	939
Total Eliminated		2,649	194,292	1,651	1,522	242,688	939
Total Net Figures		952,239	135,276,383	639,518	346,373	27,368,352	193,249
Total Gross Figures		954,888	135,470,675	641,169	347,895	27,611,040	194,188

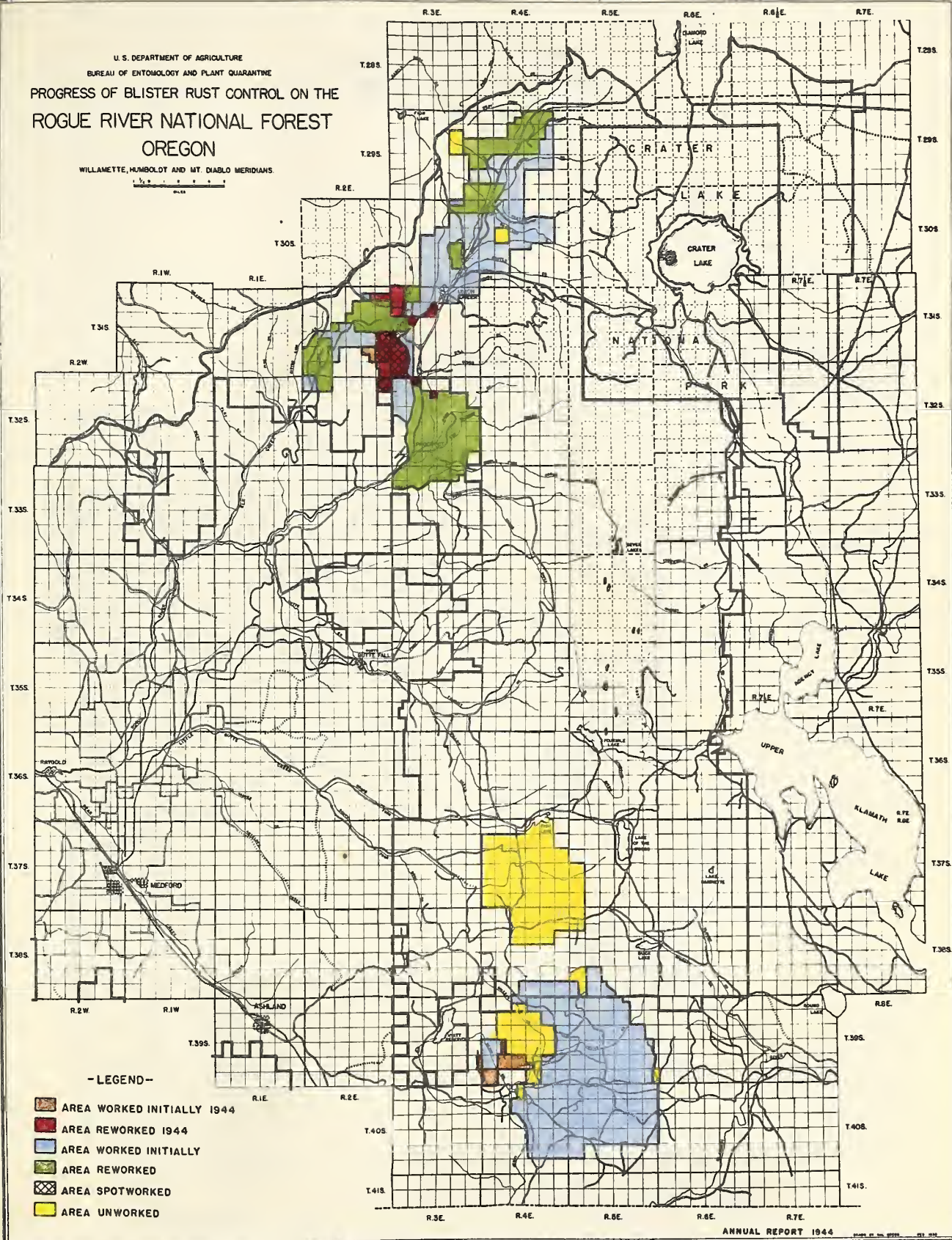
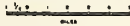
State	Operating Agency	Third and Other Workings			All Workings		
		Acres	Ribes	Man Days	Acres	Ribes	Man Days
Oregon*	Bureau	244	115,168	398	4,415	552,148	2,988
Total Eliminated		244	115,168	398	4,415	552,148	2,988
Total Net Figures		75,448	6,943,882	40,647	1374,060	169,588,617	873,414
Total Gross Figures		75,692	7,059,050	41,045	1378,475	170,140,765	876,402

*No control areas eliminated in California.

MAPS OF ACTIVE CONTROL OPERATIONS SHOWING
THE STATUS OF BLISTER RUST CONTROL
AS OF DECEMBER 31, 1944

U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
ROGUE RIVER NATIONAL FOREST
OREGON

WILLAMETTE, HUMBOLDT AND MT. DIABLO MERIDIANS



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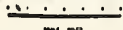
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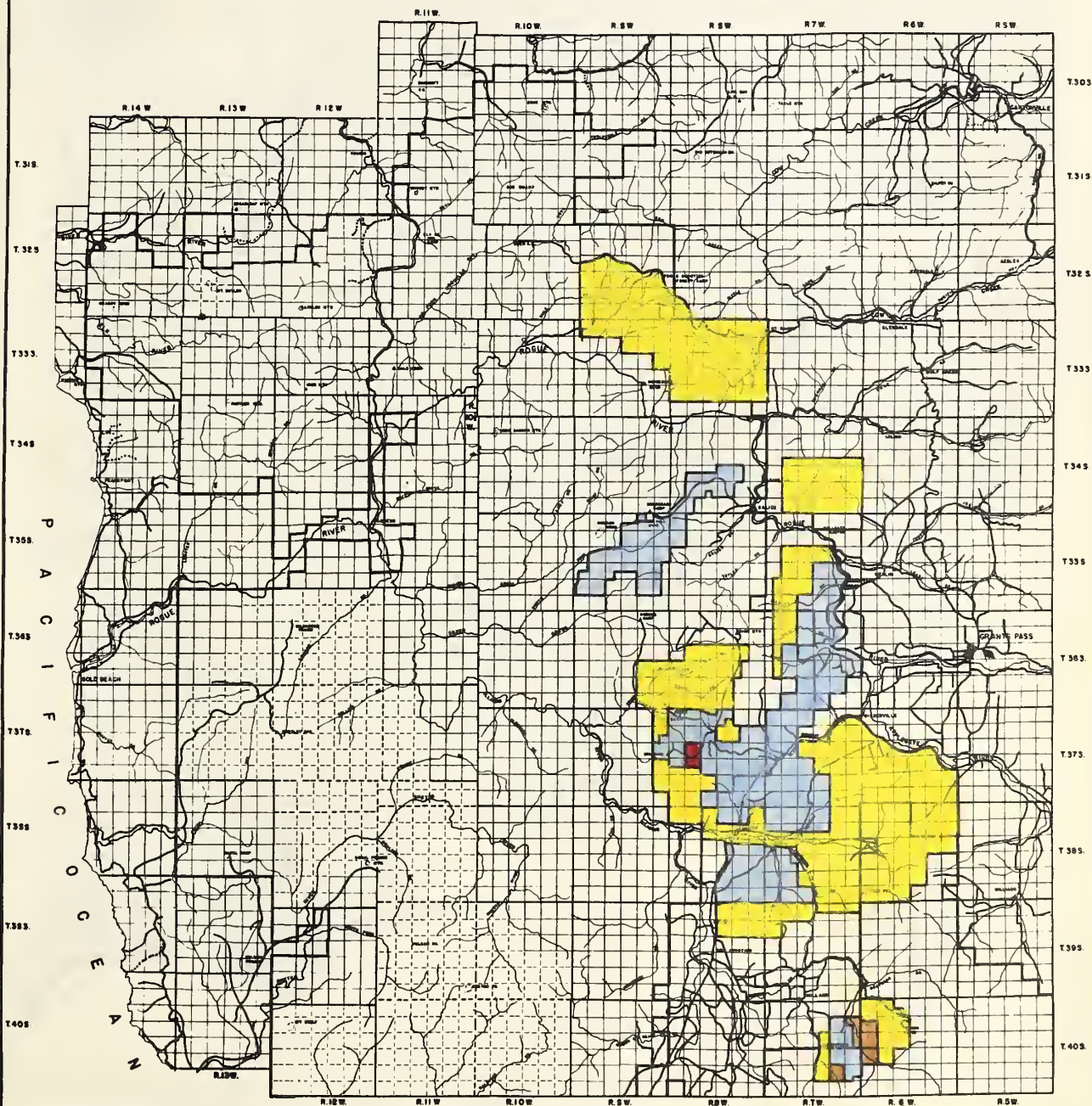
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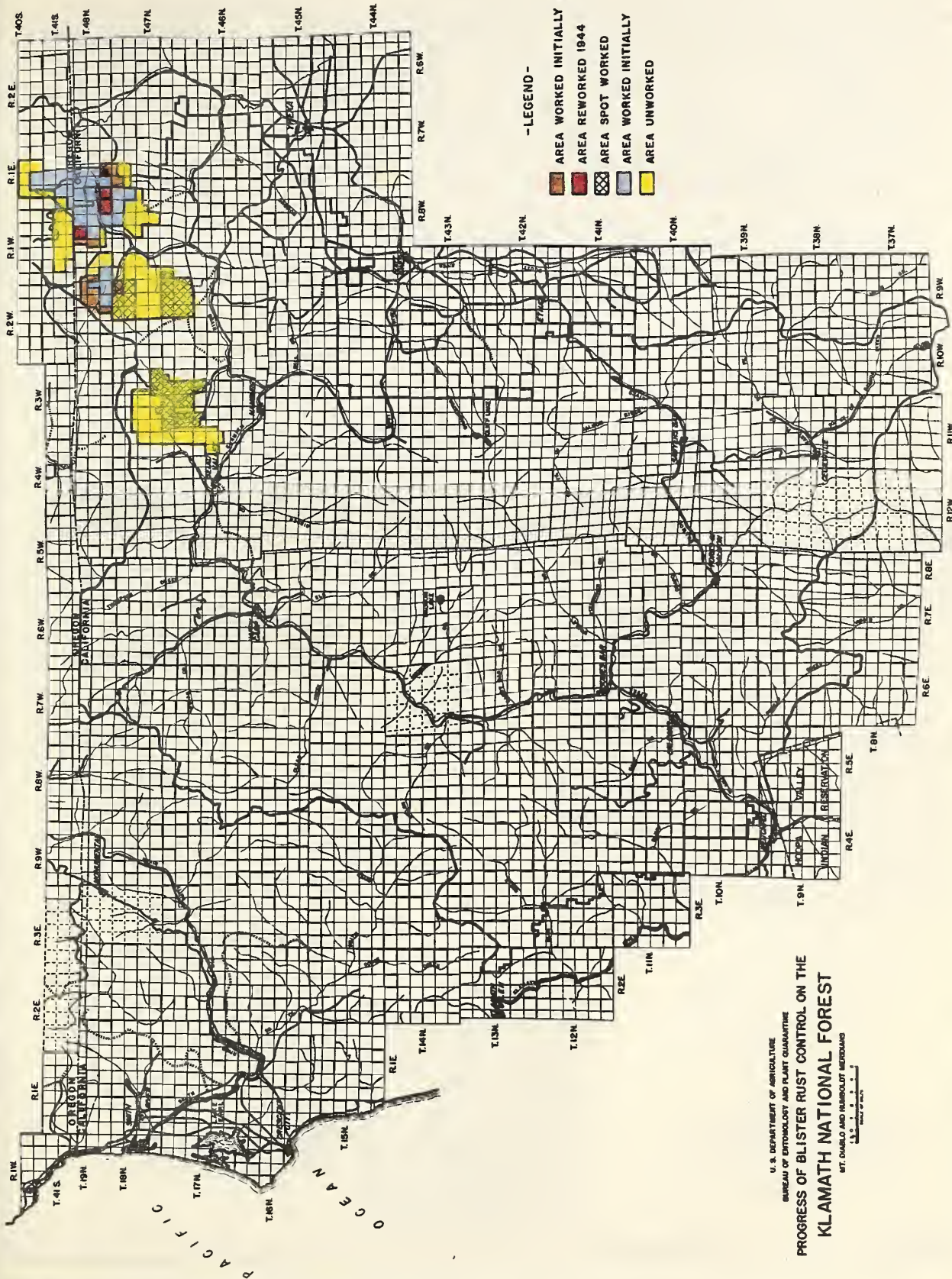
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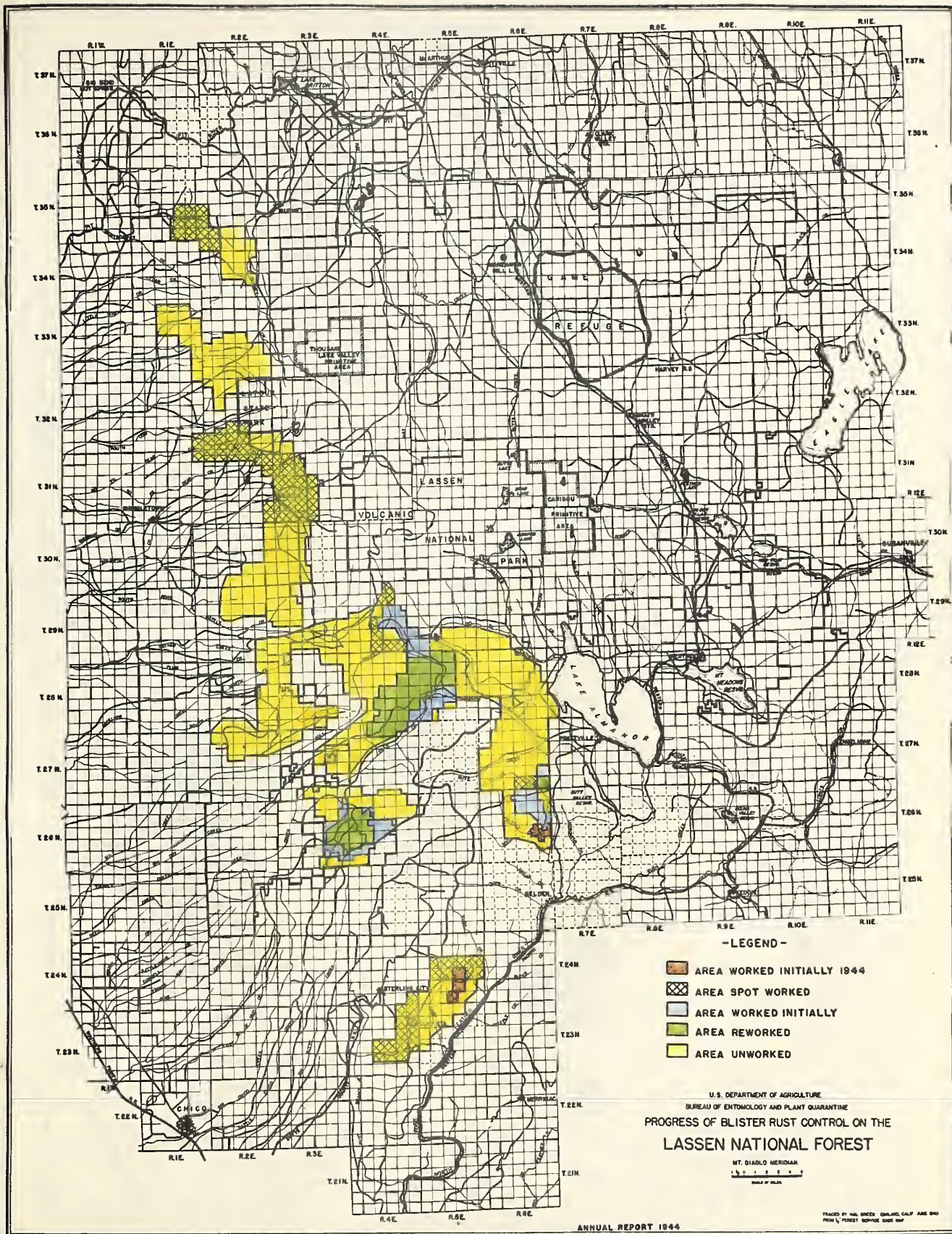


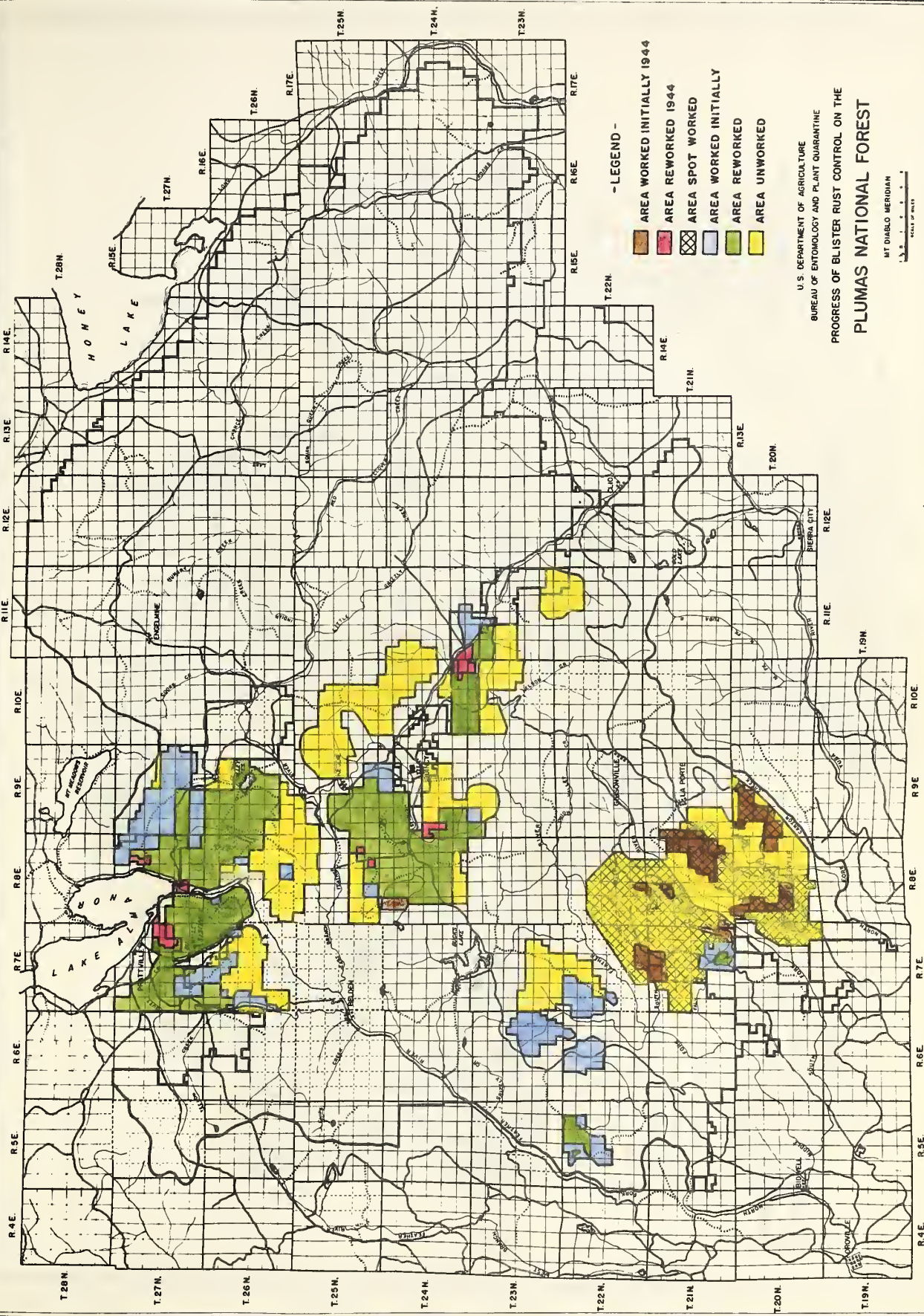
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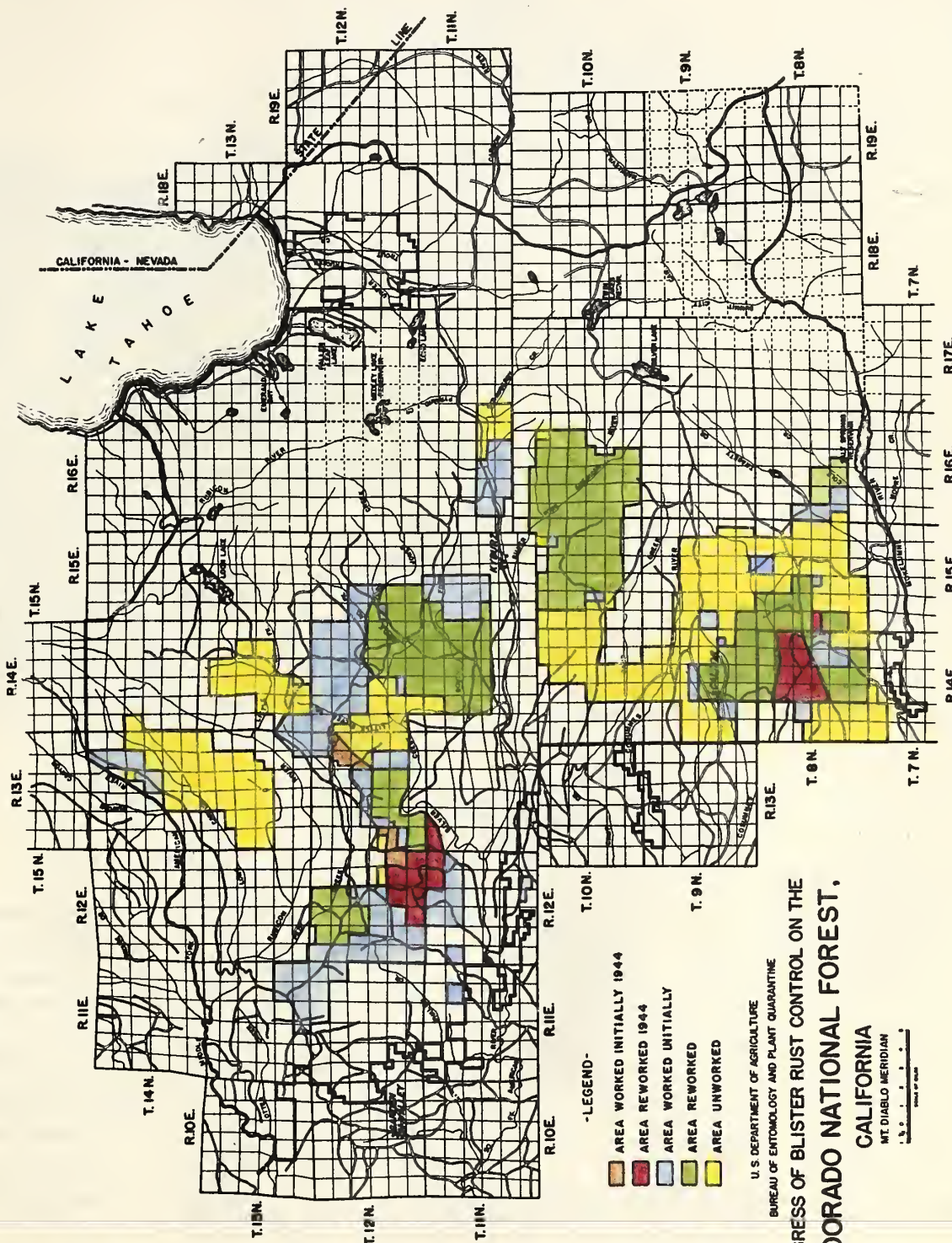


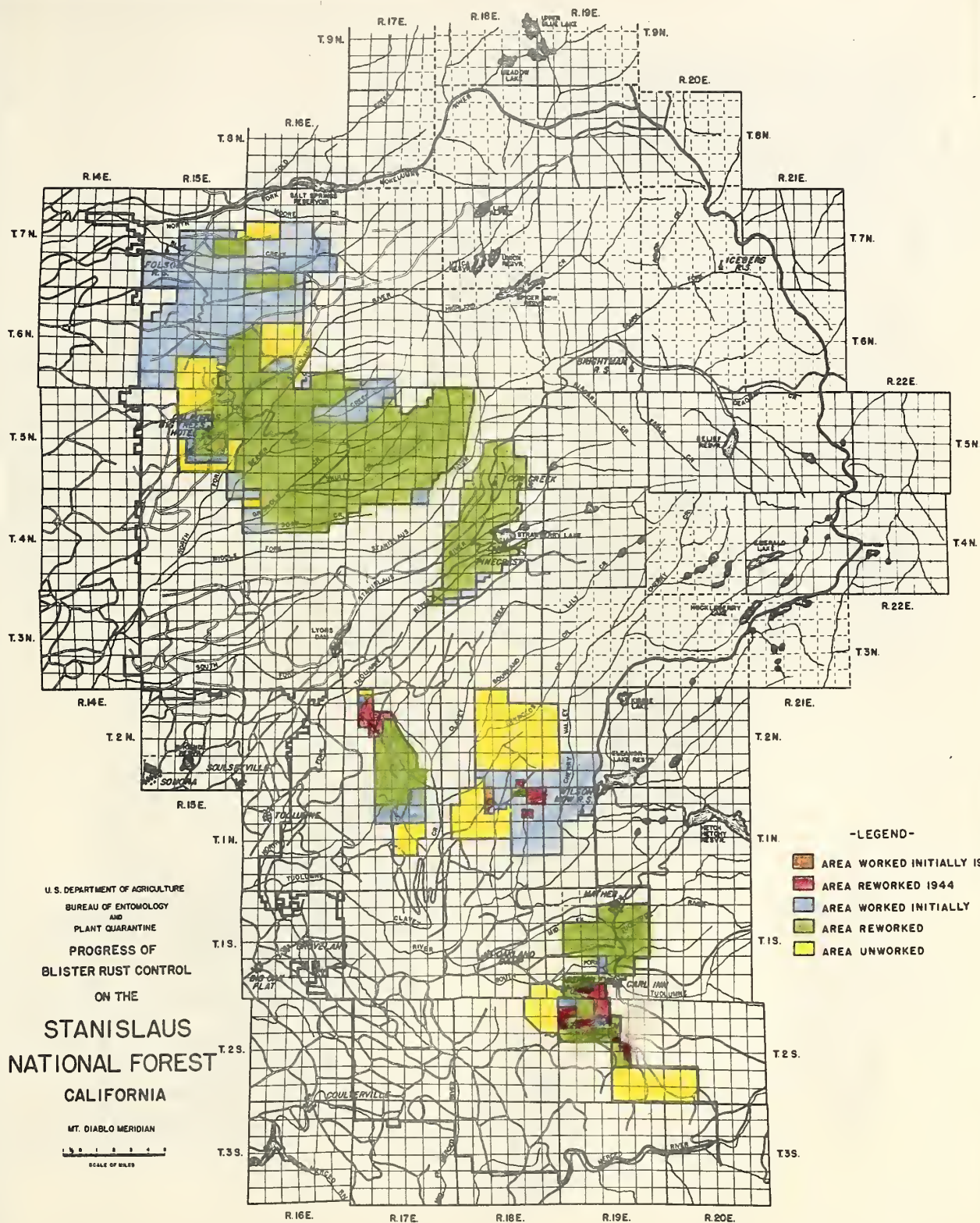
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U.S. DEPARTMENT OF AGRICULTURE
 BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
 PROGRESS OF BLISTER RUST CONTROL ON THE
 PLUMAS NATIONAL FOREST

AT DIABLO MERIDIAN
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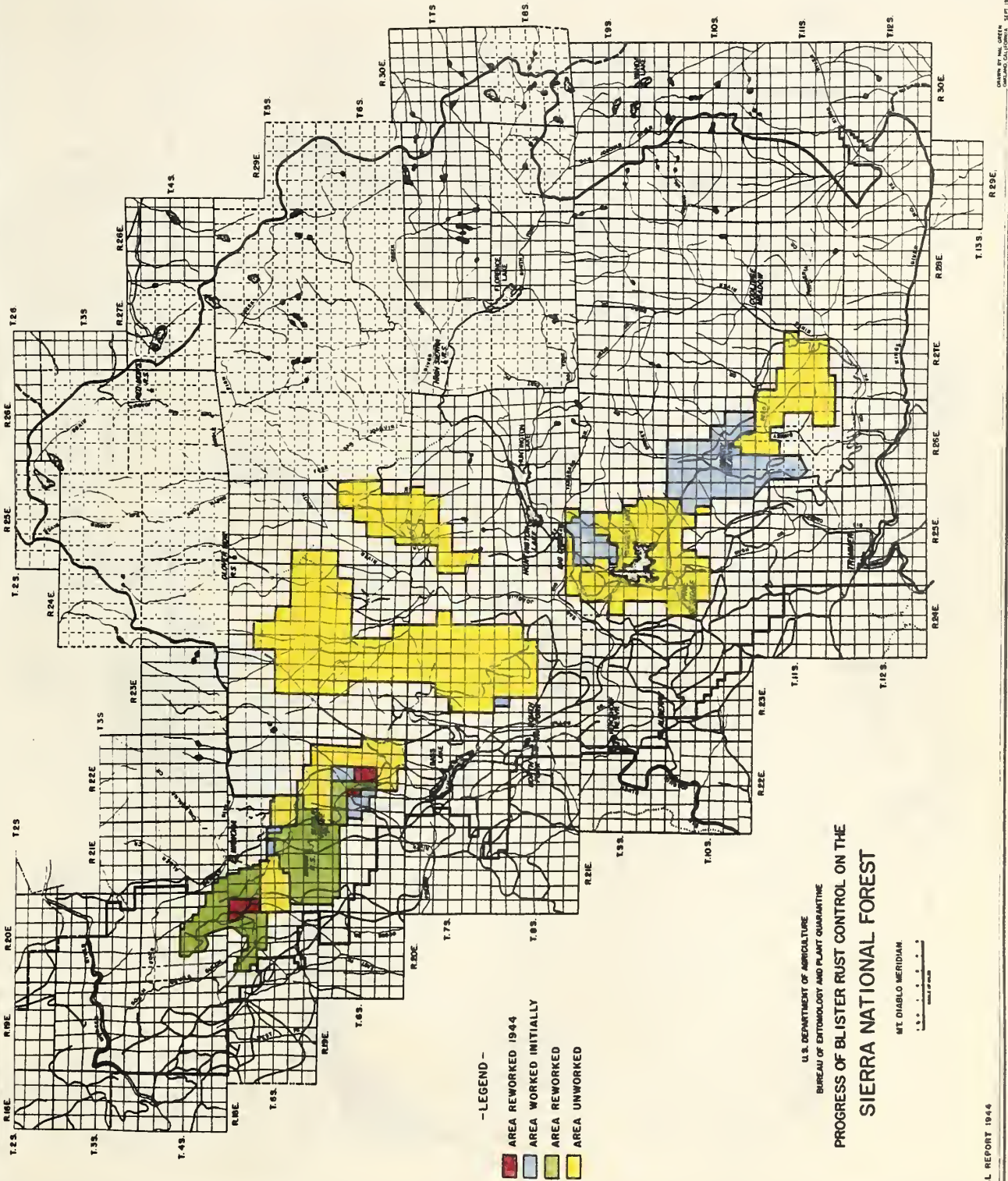
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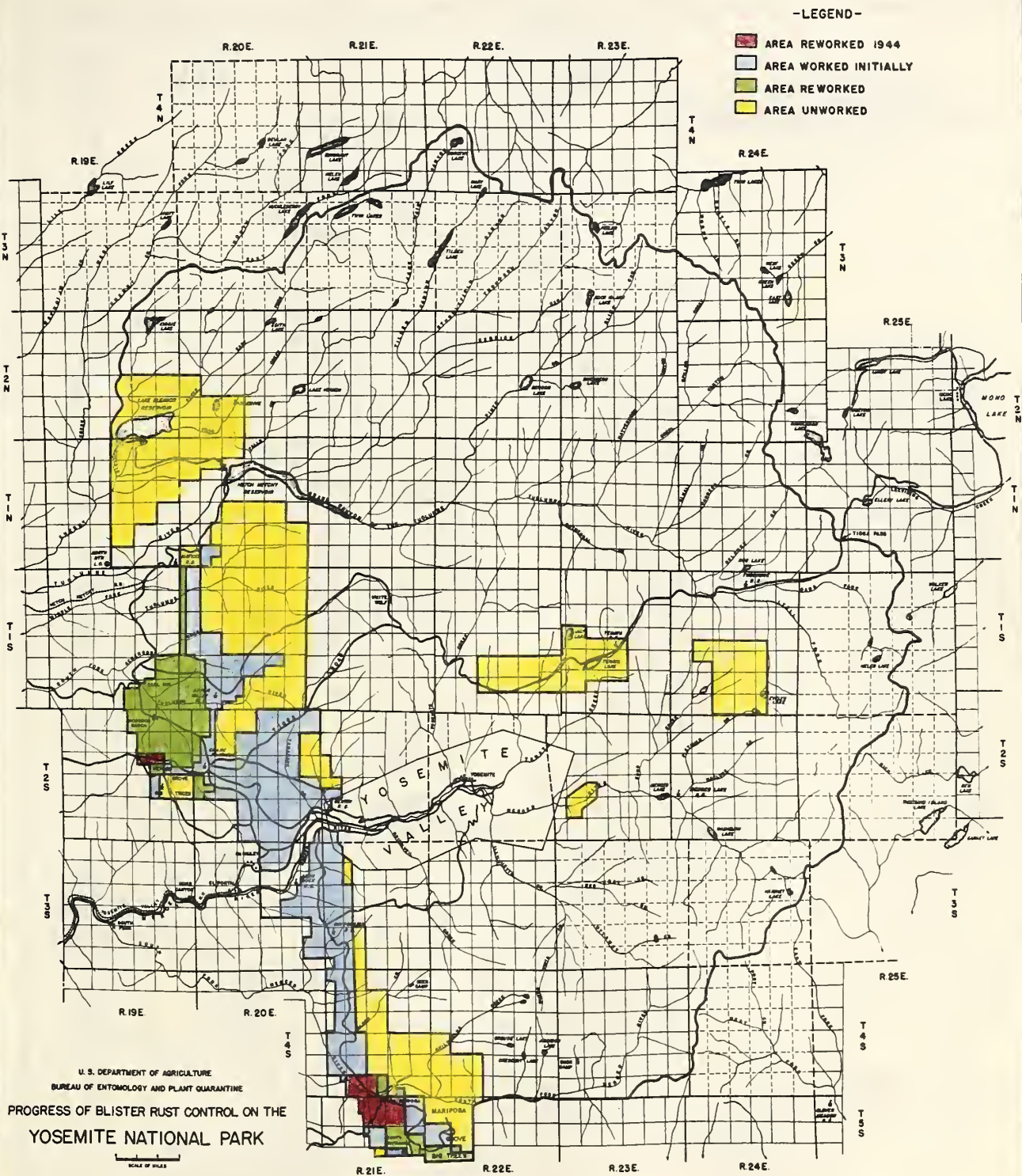
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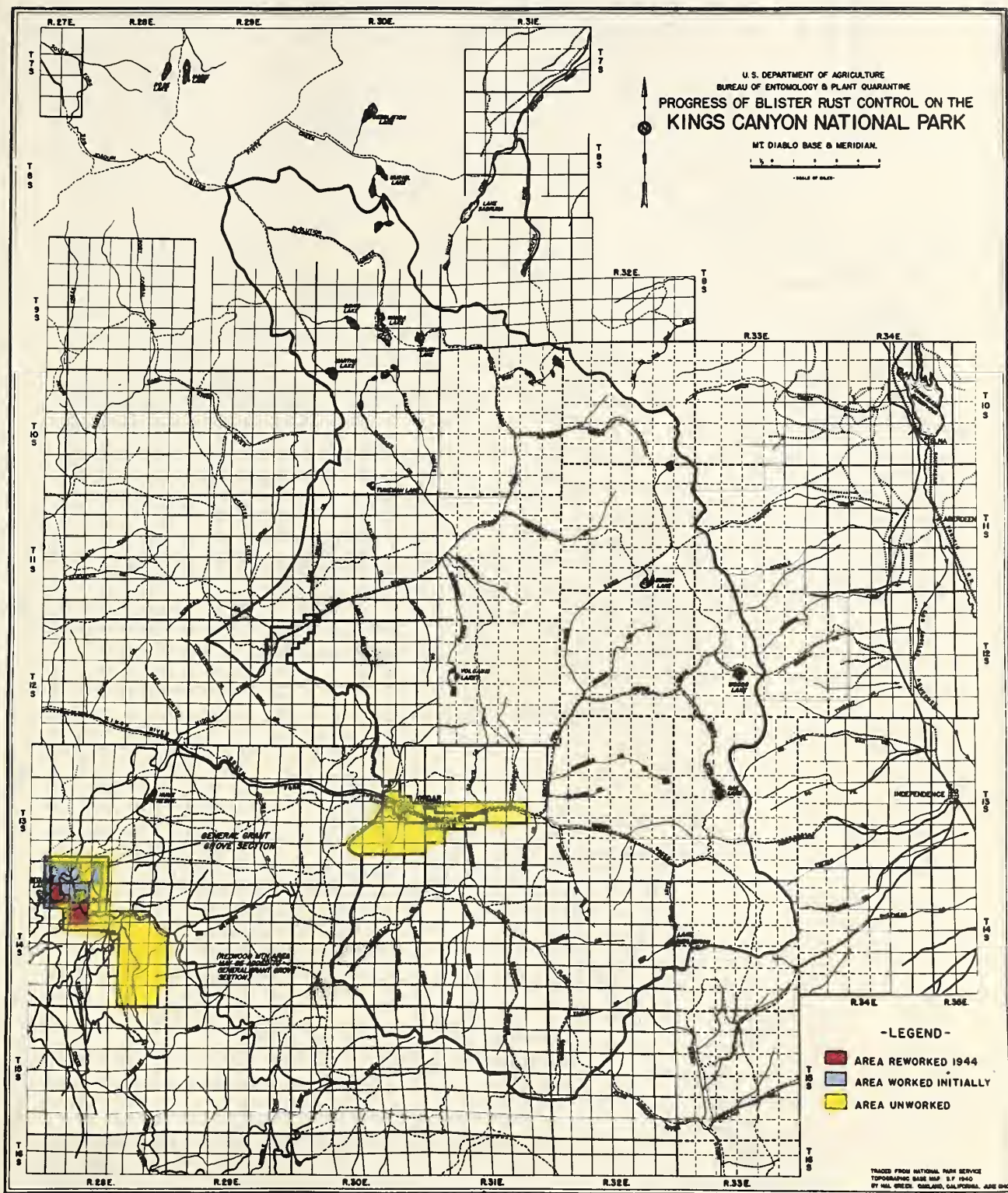
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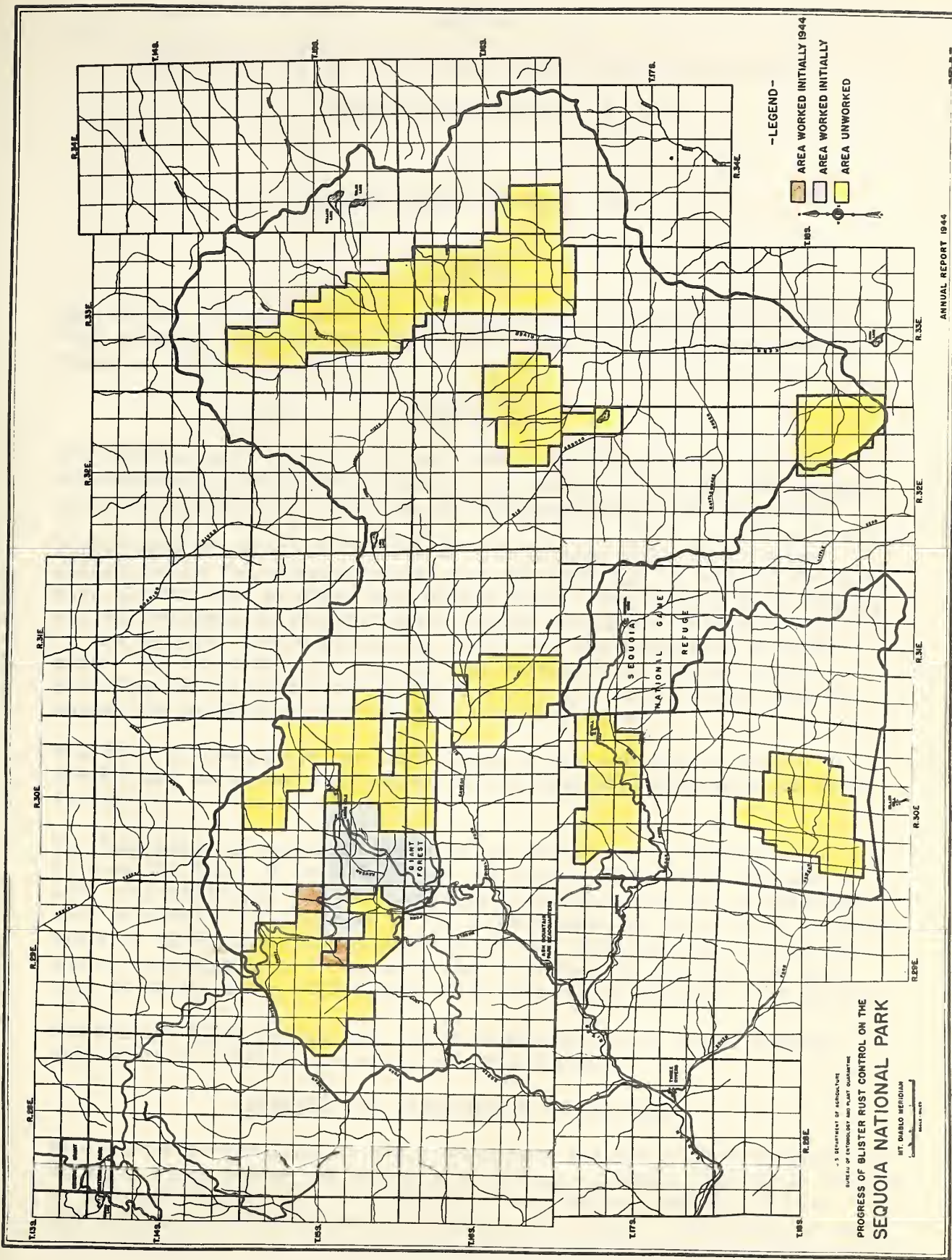
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PART III

COOPERATIVE BLISTER RUST CONTROL ON STATE AND PRIVATE LANDS

Financial Project BLR-3-5

By

Benton Howard, Forester, P-3

PURPOSE

The purpose of this project is the protection from white pine blister rust of those sugar pine stands of California and Oregon which are in State and private ownership.

COOPERATORS

All agencies and timber owners both public and private are eligible to participate in the control of white pine blister rust under the leadership and direction of the Bureau of Entomology and Plant Quarantine.

During 1943 the State of California appropriated \$100,000 to be expended during the biennium ending June 30, 1945 for the control of white pine blister rust on State and private lands. The Diamond Match Company and the Michigan-California Lumber Company continued their participation in the project, each contributing \$2,000 for the protection of sugar pine. The funds thus contributed were matched with Federal monies according to the provisions of the Lea Act, and the combined funds financed the cooperative blister rust control program.

The State of Oregon did not participate in the cooperative control project and as a result all control activities were restricted to California.

The Memorandum of Agreement defining the conditions of cooperation between the State of California and the Bureau, originally executed in 1942, was continued. An understanding restricting the use of teen-aged boys on forest fire suppression was reached with the Division of Forestry, State of California. The provisions of this understanding limited the use of teen-aged boys to not more than four days on any fire nor more than 12 hours on any shift, both to be followed by adequate rest periods.

The Diamond Match Company and the Michigan-California Lumber Company renewed their working agreements with the Bureau.

LOCATION AND ORGANIZATION OF THE WORK

First priority was given to areas which have had one or more workings and on which ribes bushes had regenerated to such an extent that large amounts of new seed were about to be produced. One camp was assigned to the Eldorado National Forest to work this class of area. The remaining camps were assigned to initial ribes eradication on areas of high rust hazard

within units where blister rust is either present or apt to become established in the very near future. Five camps were located on the Plumas National Forest, two on the Lassen National Forest, and one on the Eldorado National Forest.

These nine camps were financed from the cooperative funds and at the peak of the season employed 475 men.

CAMPS ENGAGED IN COOPERATIVE RIBES ERADICATION DURING 1944

National Forest	Location of Camp	Size of Camp	Operating Period
Lassen	Humbug	45 men	June 26 to August 26
	Rag Dump	45 men	June 26 to August 28
Plumas	Camel Peak	50 men	June 21 to September 1
	Cascade	50 men	June 12 to September 1
	Walter's Mine	50 men	June 14 to August 28
	American House	50 men	June 19 to August 30
	Frosty Hollow	50 men	June 20 to September 6
Eldorado	Davis Cabin	50 men	June 19 to August 25
	Butcher's Corral	50 men	June 17 to September 6

It was necessary to secure labor from the high schools of California as in 1943. Even though a few boys returned from last year the average age was less than before, with the majority of the boys being under 17 years of age. The boys were restless and unable to do work of standard quality; the problems of discipline and maintaining interest in the work were acute. All camps were overmanned at the beginning of the season to meet anticipated turnover and to allow for their use on fires. This factor coupled with a few replacements secured early in July allowed all camps to remain open until the end of August.

Several camp superintendents employed during 1943 returned and as a result the level of supervision was somewhat higher this year. The field season was short since it was necessary for the period of camp operation to coincide with the school vacation.

Food rationing complicated the purchasing of subsistence supplies, but adequate amounts were available to feed the men properly. It was exceedingly difficult to obtain and keep competent kitchen help.

The use of the camps by the Federal and State forest services on the suppression of fires somewhat reduced the output for the season. However, the fire duty was not excessive and the time lost was about as anticipated. The agreement limiting the use of the teen-aged boys to not over four days on any fire to be followed by an extensive rest period was effective and no camp was subjected to excessive periods of fire fighting.

ACCOMPLISHMENTS

Lassen National Forest

The Humbug Valley camp commenced operations on June 26 and finished the season on August 26. The crews performed initial ribes eradication on

961 acres of land which had been logged during 1940. As a result of this 1940 disturbance, ribes were numerous and about to produce large amounts of seed. Much post logging sugar pine reproduction is becoming established throughout this area. All recently cut-over lands on which ribes have appreciably regenerated have now been covered and no additional work should be required in this unit for several years. The Red River Lumber Company is the principal owner.

The crews from the Rag Dump camp continued the spot working of the Flea Valley unit which was started in 1943. Ribes were removed from local areas where conditions of sugar pine, ribes, and site were particularly favorable for the incidence and intensification of the rust. Initial eradication of ribes was done on 762 acres and partial protection was given to 4,000 acres within this unit. Infected ribes were numerous throughout this area and one infection center consisting of 10 trees with 22 cankers was found near Lynch Meadows. All apparent cankers and thousands of infected ribes were removed. Most of the unit was cut over many years ago and now supports one of the best stands of young sugar pine in California. The principal owner is the Diamond Match Company.

Plumas National Forest

Five camps were located on the southwest side of the forest in the Cascade-Strawberry Valley unit. The first camp was opened on June 12 and the last camp closed on September 6. Three of these camps, Camel Peak, Cascade, and Walter's Mine, were assigned to initial eradication on the area northeast of the South Fork of the Feather River, which was spot worked in 1942. They worked areas which supported numerous ribes and which will require several workings before ribes suppression can be achieved. The lands logged by the Feather River Pine Mills during 1941 were worked, since ribes regeneration was common on this area.

These camps covered 3,126 acres during the season. The topography is steep and the ground cover is dense. The presence of tanbark oak as a dense understory greatly handicapped the crews. Rusted ribes were present but not common. Several infection centers on sugar pine were found in this vicinity during 1941 and 1942, and all cankers have been removed. No additional cankers were found in 1944. There was less rust in this area in 1944 than in any other part of the sugar pine belt on the southwest side of the Plumas.

That part of the unit between the South Fork of the Feather River and Slate Creek was partially spot worked in 1943, and two camps, American House and Frosty Hollow, continued with this work. Rusted ribes were common throughout the area. Infected sugar pines were found in Lost Creek Canyon in 1941, 1942, and 1943 and several additional infected pines were discovered during 1944. All cankers found in the infection centers were removed. The crews concentrated on the Lost Creek basin where the topography is steep and rough. Much tanbark oak is present and the ground cover is dense. These factors slowed the crews considerably. The camps removed ribes from 3,059 acres. Nearly all of this area is still covered with mature timber, but logging on a major scale began in 1944.

The Cascade-Strawberry Valley unit supports an excellent stand of sugar pine, and advance reproduction is plentiful. The site is good and growth is rapid. The rainfall is nearly the heaviest in California, averaging about 70 inches per year. The principal owners are the Feather River Pine Mills and the Soper-Wheeler Timber Company.

Eldorado National Forest

Two camps of 50 boys each were opened in June on the Georgetown Divide of the Eldorado National Forest. The camps continued ribes eradication on areas which were started in 1943.

The Davis Cabin crews performed initial eradication of ribes on 1,949 acres of recently cut-over land supporting many new ribes bushes that were about to produce quantities of seed. The area supports an excellent stand of young sugar pine.

The Butcher's Corral camp reeradicated ribes from cut-over areas which received their initial treatment in 1936 and 1937. The 2,736 acres thus covered should not require any further work for several years.

Checking

The lack of competent technicians and the shortness of the season greatly curtailed all checking work. It was impossible to perform all the checking that was needed. Most of the required advance and post checks were made, but few areas received a regular check after crew work.

Summary of Ribes Eradication

The present control program, which is curtailed because of the war, must of necessity give preference and be restricted to areas where ribes regeneration has been excessive and to areas where the rust is present. Nearly all areas which have had one or more workings and on which excessive ribes regeneration has occurred have received further treatment. Spot working of areas on the Lassen and Plumas National Forests, which was started in 1942, was continued during 1944. On areas which had received this partial protection appreciably fewer rusted ribes were found than on similar areas elsewhere on these forests.

The cooperative project in 1944 destroyed ribes on 11,609 acres (initial work and reeradication). The results in full are given in the seven accompanying summary tables.

RECOMMENDATIONS

On all operations first priority of work should be given to ribes eradication on areas which have previously been worked and are now supporting numerous ribes bushes which are about to produce large quantities of seed. The practice of spot working, i.e., the removal of ribes from selected local areas which are favorable to the incidence of the rust, should be continued on all control units where the rust is present. Initial work should be restricted to recently cut-over lands on which sufficient sugar pine reproduction is present to warrant protection and on which numerous ribes have become established.

The work of the cooperative project should continue to be directed toward: (1) preventing the rust from becoming firmly entrenched at sites where conditions are favorable to rust development, (2) removing both cankers and ribs from all known infection centers to prevent the rapid build-up of the disease, and (3) continuing the overall control program as rapidly as possible.

TABLE 1

SUMMARY OF COOPERATIVE RIBES READIATION IN CALIFORNIA IN 1944

Control Operation	Acres		6-Hour Man Days	Ribes Eradicated	Per Acre Worked		Ownership Status				Acres Ribes-Free At Reeradication	
	Worked	Blocked Out			6-Hour Man Days	Ribes Eradicated	Acres Covered		6-Hour Man Days		Federal	Private
							Federal	Private	Federal	Private		
Initial Work												
Lassen National Forest	1,723		2,193	280,824	1.27	163	206	1,517	210	1,983	35,629	245,195
Pinnacles National Forest	5,201		8,273	1,605,925	1.59	309	2,066	3,135	2,743	5,530	596,625	1,009,300
Kidder National Forest	1,949		1,932	201,869	0.99	104	160	1,789	130	1,802	8,000	193,869
Totals - -	8,873		12,398	2,088,618	1.40	235	2,432	6,441	3,083	9,315	640,254	1,448,364
Reeradication												
Kidder National Forest	2,736		1,398	100,210	0.51	37	1,112	1,624	524	874	29,984	70,226
All Workings												
Lassen National Forest	1,723		2,193	280,824	1.27	163	206	1,517	210	1,983	35,629	245,195
Pinnacles National Forest	5,201		8,273	1,605,925	1.59	309	2,066	3,135	2,743	5,530	596,625	1,009,300
Kidder National Forest	4,685		3,330	302,079	0.71	64	1,272	3,413	694	2,676	37,984	264,095
Totals - -	11,609		13,796	2,188,828	1.19	189	3,944	8,065	3,607	10,189	670,238	1,518,590

TABLE 2

SUMMARY OF COOPERATIVE RIBES READIATION IN CALIFORNIA 1941-1944

Control Operation	Acres		6-Hour Man Days	Ribes Eradicated	6-Hour Man Days	Per Acre Worked	Ownership Status				Ribes Eradicated				Acres Ribes-Free At Reeradication		
	Worked	Blocked Out					Total	Acres Covered			6-Hour Man Days			Federal		Private	State
								Federal	Private	State	Federal	Private	State				
Initial Work																	
Lassen National Forest	9,570		9,570	10,210	1,855,132	1.07	194	2,489	7,081			2,481	7,729		494,257	1,400,875	
Pinnacles National Forest	8,359		8,359	11,591	2,496,171	1.38	294	3,148	5,211			4,040	7,501		921,666	1,536,505	
Kidder National Forest	7,449	430	7,879	5,633	855,491	0.76	115	620	7,259			413	5,420		47,990	807,541	
Totals - - -	25,378	430	25,808	27,584	5,168,794	1.09	204	6,257	19,551			6,934	20,560		1,423,873	3,744,921	
Reeradication																	
Lassen National Forest	6,980		6,980	2,075	312,498	0.30	45	698	6,322			177	1,898		26,220	286,238	
Pinnacles National Forest	547		547	85	18,304	0.16	33	547					85			18,304	
Kidder National Forest	9,384		9,384	4,160	385,426	0.44	41	1,677	6,604	1,103		769	3,008	383	63,617	303,103	
Totals - - -	11,903		11,903	3,522	444,201	0.30	37	1,742	10,161			358	3,164		15,580	408,621	
Calaveras Big Trees State Park	1,125		1,125	466	22,525	0.41	20		75	1,090			20	446		722	
Totals - - -	29,939		29,939	10,308	1,182,914	0.34	40	4,077	23,709	2,153		1,304	8,175	829	126,417	1,016,988	
All Workings																	
Lassen National Forest	16,550		16,550	12,285	2,167,590	0.74	131	3,147	13,403			2,698	9,627		480,477	1,687,113	
Pinnacles National Forest	8,906		8,906	11,626	2,476,475	1.31	278	3,148	5,758			4,040	7,586		921,666	1,554,809	
Kidder National Forest	16,633	430	17,063	9,993	1,240,917	0.59	74	2,297	13,863	1,103		1,182	8,428	383	111,567	1,110,644	
Stanislaus National Forest	11,903		11,903	3,522	444,201	0.40	37	1,742	10,161			358	3,164		35,580	408,621	
Calaveras Big Trees State Park	1,125		1,125	466	22,525	0.41	20		75	1,090			20	446		722	
Totals - - -	55,317	430	55,747	37,892	6,351,708	0.68	115	10,334	43,260	2,153		8,238	28,825	829	1,549,290	4,761,909	
															40,509	8,431	

TABLE 3
SUMMARY OF CHECKING ON THE COOPERATIVE PROJECT - 1944

Operation	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days
Plumas	2,829	4.2	40 7/8	7,405	2.6	112	622	2.5	7 6/8	10,856	3.0	160 5/8
Eldorado	850	2.5	9 4/8	-	-	-	5,003	3.7	109 2/8	5,853	3.6	118 6/8
Totals	3,679	3.8	50 3/8	7,405	2.6	112	5,625	3.6	117	16,709	3.2	279 3/8

TABLE 4
SUMMARY OF RIBES ERADICATION BY THE BUREAU OF ENTOMOLOGY & PLANT QUARANTINE 1925-1944

Control Operation	Acres		8-Hour Man Days	Ribes Eradicated	Ownership Status										Acres Ribes-Free At Re-eradication		
	Worked	Blocked Out			Federal		National Forest		State		Federal		National Forest		State		
					O & C	Total	O & C	Total	O & C	Total	O & C	Total	O & C	Total			
Initial Work																	
California:																	
Lesser N. F.	20,761	9,349	30,110	15,104	2,677,998	0.73	136	7,149	22,981	3,706	11,398	3,706	11,398	717,147	2,160,551	717,147	2,160,551
Plumas N. F.	69,405	15,993	85,398	51,122	11,670,285	0.74	171	24,761	60,597	16,194	34,907	16,194	34,907	3,751,927	8,113,738	3,751,927	8,113,738
Kiddie N. F.	85,154	26,092	111,246	61,116	16,021,349	0.72	188	26,565	82,019	2,602	14,036	2,602	14,036	14,036	46,446	1,694	1,694
Stanislaus N. F.	123,360	9,231	132,591	58,691	19,422,485	0.48	157	25,415	106,769	9,590	46,972	9,590	46,972	2,320,938	17,084,773	2,320,938	17,084,773
Calaveras Big Trees State Park	1,868		1,868	1,339	188,261	0.72	101		120	1,407							
Sierra N. F.	50,418	50,418	100,836	76,090	15,991,271	1.51	317	35,638	14,780	54,059	22,031	54,059	22,031	10,930,704	5,084,567	10,930,704	5,084,567
Subtotal	350,966	60,605	411,571	263,462	66,375,849	0.75	189	113,528	287,866	4,797	97,955	4,797	97,955	21,413,560	144,444,869	21,413,560	144,444,869
Oregon:																	
Regina River N. F.	70,413	70,039	140,452	46,610	15,798,559	0.66	224	65,155	5,394	39,728	6,902	39,728	6,902	14,496,200	196,371	14,496,200	196,371
Siaticum N. F.	20,918	36,926	57,844	10,789	761,216	0.52	36	6,162	13,539	26,201	31,343	26,201	31,343	94,885	174,447	26,201	31,343
Klamath N. F.	4,275	23	4,568	6,489	533,529	1.52	125	3,739	629	1,607	1,882	1,607	1,882	419,719	113,810	419,719	113,810
Barney Sanitation	466		466	500	352	0.72	10										
Subtotal	96,092	107,662	203,694	64,280	17,098,653	0.67	178	75,556	24,933	100,469	102,493	100,469	102,493	15,010,764	370,788	15,010,764	370,788
Totals	447,078	168,207	615,285	327,722	83,474,212	0.73	187	195,084	24,933	220,017	389,739	220,017	389,739	36,424,344	36,795,132	36,424,344	36,795,132
Reeradication																	
California:																	
Lesser N. F.	8,640	2,398	11,038	8,640	324,056	0.27	37	1,375	7,465	281	2,107	281	2,107	30,668	281,388	30,668	281,388
Plumas N. F.	20,096	11,069	31,165	13,127	1,311,269	0.55	66	6,169	13,727	3,094	7,975	3,094	7,975	377,216	934,053	377,216	934,053
Kiddie N. F.	32,426	17,915	50,341	26,031	1,582,304	0.55	49	8,370	22,952	1,103	1,103	1,103	1,103	405,387	1,182,921	405,387	1,182,921
Stanislaus N. F.	64,766	25,211	89,977	40,422	5,501,930	0.39	87	26,162	36,124	10,765	14,446	10,765	14,446	2,922,479	2,578,751	2,922,479	2,578,751
Calaveras Big Trees State Park	1,340		1,340	492	27,317	0.37	20		75	1,265							
Sierra N. F.	1,165	1,421	2,586	1,421	223,582	1.20	189	885	300	1,003	418	1,003	418	161,997	59,545	161,997	59,545
Subtotal	128,672	58,906	187,578	89,066	8,970,198	0.45	70	43,661	82,843	19,446	36,205	19,446	36,205	3,900,147	5,024,750	3,900,147	5,024,750
Oregon:																	
Regina River N. F.	33,142	7,517	40,659	15,117	939,462	0.23	28	20,950	12,192	5,664	1,853	5,664	1,853	766,931	172,531	766,931	172,531
Subtotal	161,814	66,023	227,837	94,184	9,909,660	0.41	61	64,611	94,855	25,110	40,058	25,110	40,058	4,667,078	5,197,281	4,667,078	5,197,281
All Workings																	
California:																	
Lesser N. F.	29,621	9,349	38,970	17,502	3,202,054	0.59	108	8,524	30,446	3,997	13,505	3,997	13,505	748,115	2,453,939	748,115	2,453,939
Plumas N. F.	89,501	15,993	105,494	62,191	13,181,554	0.69	147	31,130	74,324	19,288	48,682	19,288	48,682	4,129,143	9,047,791	4,129,143	9,047,791
Kiddie N. F.	117,579	26,092	143,671	79,031	17,603,693	0.67	150	34,935	104,971	3,705	18,329	3,705	18,329	4,097,931	13,176,161	4,097,931	13,176,161
Stanislaus N. F.	188,146	9,231	197,377	87,902	24,924,115	0.45	132	52,077	144,893	20,355	63,418	20,355	63,418	5,241,817	19,663,310	5,241,817	19,663,310
Calaveras Big Trees State Park	3,208		3,208	1,631	215,578	0.57	67		195								
Sierra N. F.	51,603	77,511	129,114	51,603	16,218,853	1.50	314	36,523	15,080	55,062	22,449	55,062	22,449	11,094,701	5,124,152	11,094,701	5,124,152
Subtotal	479,658	60,605	540,263	322,968	75,345,847	0.57	157	161,189	369,509	7,165	117,031	7,165	117,031	25,313,707	144,466,593	25,313,707	144,466,593
Oregon:																	
Regina River N. F.	103,955	70,039	173,994	54,147	16,738,024	0.52	162	86,105	5,394	45,392	6,755	45,392	6,755	15,263,131	196,371	15,263,131	196,371
Siaticum N. F.	20,918	36,926	57,844	10,789	761,216	0.52	36	6,162	13,539	26,201	31,343	26,201	31,343	94,885	174,447	26,201	31,343
Klamath N. F.	4,275	23	4,568	6,489	533,529	1.52	125	3,739	629	1,607	1,882	1,607	1,882	419,719	113,810	419,719	113,810
Barney Sanitation	466		466	500	352	0.72	10										
Subtotal	129,234	107,662	236,896	77,777	18,038,085	0.56	140	96,506	24,933	100,469	102,493	100,469	102,493	15,010,764	370,788	15,010,764	370,788
Totals	608,892	168,207	777,099	395,745	93,383,932	0.65	153	195,595	24,933	220,017	389,739	220,017	389,739	36,424,344	36,795,132	36,424,344	36,795,132

*Includes 7,516 acres, 3,905 man days, and 1,271,951 ribes on lands worked by the Bureau of Entomology & Plant Quarantine now in Yosemite National Park.

**Includes 490 acres, 326 man days, and 298,657 ribes on lands worked by the Bureau of Entomology & Plant Quarantine now in Yosemite National Park.

TABLE 5

(Omnibus Table 2, Sheet 7)

SUMMARY OF RIBES ERADICATION ON STATE AND PRIVATE LANDS IN 1944
PACIFIC COAST REGION

State and Private Lands	First Working			Second and Other Workings				All Workings		
	Acres	Per Acre		Acres	Per Acre		Acres Second Working Only	Acres	Per Acre	
		Ribes	Man Days		Ribes	Man Days			Ribes	Man Days
Klamath	2,468	150	1.69	654	12	0.89	654	3,122	121	1.52
Lassen	1,517	162	1.31					1,517	162	1.31
Plumas	3,812	360	1.88	3,157	111	0.48		6,969	247	1.23
Eldorado	1,789	108	1.01	6,254	34	0.40	1,624	8,043	50	0.53
Stanislaus	125	151	2.14	1,020	127	0.50	765	1,145	129	0.68
Sierra										
California Subtotals	9,711	227	1.58	11,085	63	0.46	3,043	20,796	139	0.98
Rogue River	1,775	36	0.42	565	53	0.51	385	2,340	40	0.45
Siskiyou	240	18	0.83					240	18	0.83
Oregon Subtotals	2,015	34	0.47	565	53	0.51	385	2,580	38	0.48
Grand Totals	11,726	194	1.39	11,650	63	0.46	3,428	23,376	128	0.92

TABLE 6
(Omnibus Table 2A, Sheet 7)

SUMMARY OF RIBES ERADICATION ON STATE AND PRIVATE LANDS 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

(Net Figures Used)

State and Private	First Working			Second and Other Workings			All Workings		
	Per Acre			Per Acre			Per Acre		
	Acres	Ribes	Man Days	Acres	Ribes	Man Days	Acres	Ribes	Man Days
Klamath N. F.	14,176	81	1.07	654	12	0.89	14,830	78	1.06
Lassen N. F.	39,352	97	0.66	11,622	42	0.36	50,974	84	0.59
Lassen Volcanic N. P.	140	107	0.39	15	49	0.40	155	101	0.39
Plumas N. F.	70,511	147	0.74	42,852	76	0.57	113,363	120	0.68
Eldorado N. F.	88,185	153	0.61	46,252	47	0.56	134,437	116	0.59
Stanislaus N. F.	106,133	165	0.49	57,024	53	0.50	163,157	126	0.50
Calaveras Big Trees State Park	1,868	101	0.72	1,340	20	0.37	3,208	67	0.57
Sierra N. F.	16,156	353	1.51	6,785	128	0.62	22,941	287	1.25
California Subtotals	336,521	155	0.67	166,544	59	0.53	503,065	123	0.62
Klamath N. F.	829	137	2.27				829	137	2.27
Rogue River N. F.	72,485	17	0.11	13,232	16	0.18	85,717	16	0.12
Siskiyou N. F.	34,391	15	0.17				34,391	15	0.17
Clark-McNary Nursery	830	6	0.42				830	6	0.42
McKinley Nursery	40	72	2.78				40	72	2.78
Oregon Subtotals	108,575	17	0.15	13,232	16	0.18	121,807	17	0.15
Grand Totals	445,096	121	0.54	179,776	56	0.51	624,872	103	0.53

TABLE 7

STATUS OF COOPERATIVE FUNDS FOR RIBES ERADICATION ON STATE AND PRIVATE LANDS
IN CALIFORNIA - JULY 1, 1941 TO DECEMBER 31, 1944

Cooperative Funds	Accumulative Expenditures 7/1/41 - 12/31/43	Expenditures Calendar Year 1944	Available Balances as of 1/1/45
State & Private Cash Contributions:			
State of California	\$ 150,000	\$ 65,288	\$ 25,044
Michigan-California Lumber Co.	6,000	2,049	2,000
Red River Lumber Co.*	4,000	2,048	
Diamond Match Co.	6,000	2,003	2,000
Total	\$166,000	\$ 71,388	\$ 29,044
Federal Allotments (Project 3103.14)			
1942 Fiscal Year	\$ 14,625		
1943 Fiscal Year	71,770		
1944 Fiscal Year	86,195	22,819	
1945 Fiscal Year	85,040	78,164	6,876
Total (Project 3103.14)	\$257,630	\$ 100,983	\$ 6,876
Grand Total	\$423,630	\$ 172,371	\$ 35,919

*Red River Lumber Company did not contribute for the 1945 fiscal year.

NOTE: Expenditures in the amount of \$19,031.24 were made during 1944 for emergency fire suppression at the call of the State of California, Division of Forestry and the U. S. Forest Service. Reimbursements were made by these agencies to the Bureau blister rust control funds in the amounts of \$11,401.70 from the State and \$7,629.54 from the Forest Service. These amounts were credited back to the funds from which expended and are a part of the balances shown available for expenditure.

PART IV

BLISTER RUST CONTROL BY THE FOREST SERVICE

Financial Project BLR-4

By

Carl W. Fowler, Forester, P-3

PURPOSE

The purpose of this project is to protect from white pine blister rust the white pine stands growing on national forest lands.

COOPERATION

The cooperative agreements of the Bureau of Entomology and Plant Quarantine with Regions 5 and 6 of the Forest Service were continued.

Because of the shortage of experienced personnel the Forest Service of the Eldorado, Stanislaus, and Sierra National Forests requested the Bureau's technical supervisors to assist them with the field work and the administration of their camps.

ORGANIZATION AND LOCATIONS OF THE WORK

The blister rust control program of the Forest Service was pointed toward: (1) performing all necessary reeradication work and (2) completing as much initial ribes eradication as possible on those areas where blister rust was present and ecological conditions indicated that the intensification of the rust and its spread throughout the area were imminent.

The Forest Service operated two camps in Oregon and fourteen camps in California.

Mr. Charles F. Smith, who had recently been transferred from the Indian Service, replaced E. H. Kincaid as supervisor of the Forest Service camps on the Plumas National Forest.

Again, as in 1943, the sources of labor were limited, and only by an active recruitment program were the required number of workers obtained. Three camps, all in California, were manned with inmates from San Quentin Penitentiary; transient labor was used in two camps, and the remaining 11 camps were manned by youths 16 to 18 years of age.

The convicts were better men than those assigned last season. They were well equipped with the proper type of clothing, and the prison's management of the camps was improved over that of 1943.

The labor turnover in the camps manned with transients was high, and many replacements were necessary to maintain a working force. The use of teenage boys presented the usual problems: a short field season, inexperienced workers, overmanning the camps at the start of the season, and closing the

season with a greatly reduced force. Although supervisory personnel was scarce, sufficient capable supervisors were obtained including a number of experienced men from last season. Many demands were made on blister rust crews for fire fighting and consequently there was a loss of many man days to the eradication project. This was especially true on the Stanislaus and Klamath National Forests where over one-fourth of the total work time was spent fighting fire.

DISTRIBUTION OF FOREST SERVICE CAMPS

National Forest	Location of Camp	Size of Camp	Type of Labor	Operating Period
Oregon				
Rogue River	Union Creek	100	H.S.* Boys	June 5 - Aug. 31
Siskiyou	Oregon Caves	60	H.S. Boys	June 6 - Aug. 31
California				
Klamath	Cinnabar Springs	50	Prison	May 16 - Oct. 26
	Beaver Creek	50	Prison	May 12 - Oct. 7
	Hungry Creek	40	Prison	May 29 - Oct. 4
Plumas	Meadow Valley	30	H.S. Boys	June 6 - Sept. 6
	Scales	70	H.S. Boys	June 15 - Sept. 1
	Canyon Dam	40	Transient	May 15 - Sept. 25
	Mooreville Ridge	40	Transient	July 1 - Oct. 6
Eldorado	Pi Pi	50	H.S. Boys	June 15 - Sept. 1
Stanislaus	Thompson Meadows	40	H.S. Boys	June 21 - Aug. 26
	Jawbone	40	H.S. Boys	June 19 - Aug. 31
	Carl Inn	40	H.S. Boys	June 26 - Aug. 31
	Camp 17	40	H.S. Boys	June 14 - Aug. 26
Sierra	Summit	45	H.S. Boys	June 19 - Aug. 31
	Soquel	50	H.S. Boys	June 12 - Sept. 16
Totals	16 camps	785 men		

*H.S. = High School

WORK PERFORMED AND RESULTS ACCOMPLISHED

Rogue River National Forest

The Forest Service operated one camp manned with 100 high school youths at Union Creek on the Upper Rogue River unit. The crews spent most of their time on reeradication work and the remainder on initial work. Much of the mature timber on this control unit has been cut recently and numerous ribes bushes were found along the skid trails and logging roads. These ribes were small and ordinarily would not have been removed so soon after logging, but since the 1944 season was extremely favorable for ribes infection, the work was concentrated on these areas. The areas between the skid trails supported few bushes, all of which appeared free of blister rust infection; no attempt was made to work them.

Canker elimination work by a specially trained crew was performed in conjunction with ribes eradication.

Siskiyou National Forest

The 50 youths from the Oregon Caves camp on the Siskiyou National Forest continued the initial eradication of ribes from the Bolan Lake unit. The dense

brush and steep slopes in this area made the finding and removal of ribes bushes difficult. During the latter part of the season numerous ribes growing along the streams were found to be heavily infected with blister rust. After this discovery crew work was confined mostly to the removal of the bushes in these sites.

Cankers were removed from a number of infected sugar pines found on this unit.

Klamath National Forest

Three 50-man camps were operated on the Klamath National Forest. The labor for them was secured from San Quentin Penitentiary through an agreement with the State of California. The camps, located at Cinnabar Springs, Beaver Creek, and Hungry Creek, operated from early May until the middle of October.

The crews from the Cinnabar Springs camp performed initial ribes eradication on the mature sugar pine areas of the Cinnabar Springs unit. Blister rust is becoming established in this unit as numerous infected ribes were found here in 1944 for the first time.

The crews from the Beaver Creek and Hungry Creek camps performed both initial and reeradication work on cut-over lands of the Beaver Creek unit. The reeradication work was done on areas that received initial treatment from 1940 to 1942.

Blister rust is intensifying at a rapid rate on the Beaver Creek unit. Infected ribes bushes were prevalent this season and a number of heavily infected pine centers were found. Canker elimination work in these centers was done by special crews from both the Beaver Creek and Hungry Creek camps. A total of 182,563 cankers were destroyed.

The initial job of ribes eradication must be completed soon and the reeradication work done at the proper intervals if the sugar pines on these areas are to be saved.

Plumas National Forest

Ribes eradication work on the Plumas National Forest was performed by the crews from four camps. Two camps were manned with high school youths and two with itinerant labor. The Mooreville Ridge camp, located in the same general area as the Bureau's Plumas operation, was administered by the Bureau but was financed and supplied by the Forest Service.

The 30-man crew from the Meadow Valley camp gave initial control treatment to cut-over lands on the lower slopes of Spanish Peak and removed numerous new ribes from cut-over lands that had received previous treatment. Blister rust infection was common on ribes in many places and the need for control work was urgent.

The crews from the 40-man camp at Canyon Dam performed reeradication work on lands adjacent to the southern end of Lake Almanor. These areas were cut-over lands on which ribes had become reestablished. Very few infected ribes bushes were found.

On the area between Slate and Canyon Creeks, 7,000 acres were spot worked by the 70-man crew from the Scales camp. The area supports a stand of mature sugar pine with an excellent stocking of reproduction. Tanbark oak, common here, greatly hampered the progress of the crews. Numerous infected ribes were found on all favorable sites. One infection center was discovered with 64 infected sugar pines and 172 cankers. This center is the farthest southward extension of the rust on sugar pine known in California.

The crews from the 40-man camp on Mooreville Ridge were engaged in the initial eradication of ribes from the Lost Creek burn. The influx of ribes following the Lost Creek burn was of such extent that the area worked averaged 1,176 ribes per acre. This area supports an excellent stand of sugar pine.

Eldorado National Forest

On the Eldorado National Forest the Forest Service operated one 50-man camp located in Pi Pi Valley and manned by 16 to 18 year old youths. The crews performed reeradication work on cut-over lands that had last been treated from 1938 to 1940. The ribes population was not heavy but was generally distributed over the entire area; many bushes producing fruit were destroyed.

Stanislaus National Forest

The four 40-man camps operated on the Stanislaus National Forest were located at Thompson Meadows, Jawbone, Carl Inn, and Camp 17. All were manned with high school youths.

The Thompson Meadow crews were engaged in reeradication work on old cut-over lands that had received previous treatment in 1938 and 1940. The progress of the crews was greatly retarded by brush, particularly Ceanothus cordulatus, that has become extremely dense.

The crews from the Jawbone camp divided their time between initial ribes eradication on recently cut-over lands and reeradication work on lands that had been logged since the completion of the initial work in 1936.

The work of the Camp 17 and Carl Inn crews was confined to a reeradication job on recently cut-over lands. The establishment of new bushes has been rapid on all areas disturbed by the logging operations.

Sierra National Forest

Ribes eradication work on the Sierra National Forest was performed by the crews from two camps located at Soquel and Summit Camp. Because of the excessive ribes regeneration on these areas the reeradication job has been a difficult and continuous one. Judging from ribes conditions this season it appears that ribes regeneration is diminishing and is limited to small, scattered patches. Dense brush greatly impeded the progress of the crews.

Summary of Ribes Eradication

The 30,272 man days of labor expended by the Forest Service project resulted in the destruction of 4,186,712 ribes on 10,920 acres of initial work and 23,293 acres of reeradication.

The detailed results of the season's work and general summaries of all control work to date by the Forest Service are presented in tables 1 to 6 which follow this text.

Checking

The organization and methods used in checking areas treated by the Forest Service project were the same as those employed during previous years. Owing to the shortage of checkers regular checking activities were curtailed in favor of the more essential advance and post checking.

Checking accomplishments are summarized in table 3.

EXPENDITURES

A total of \$423,458 was expended on the Forest Service blister rust control project during the calendar year of 1944. Of this amount \$356,651 was spent in California and \$66,807 in Oregon.

RECOMMENDATIONS

The ribes eradication program for 1945 should give first priority of work to those areas in the northern part of the region where blister rust damage is taking place. It is important that the needed control work be performed on these areas immediately or serious losses will result.

Next priority of work should be given to those areas previously treated where ribes regeneration has occurred to such an extent that any further delay may increase the number of workings necessary to secure permanent ribes suppression.

The practice of working areas that support numerous ribes and appear to be favorable sites for the establishment of the rust should be continued.

TABLE 1
SUMMARY OF RIBES ERADICATION BY THE FOREST SERVICE IN 1944

National Forest	Acres			6-Hour Man Days	Ribes Eradicated	Per Acre Worked		Acres Covered				Ownership				Status				Acres Ribes-Free At Re-eradication
	Worked	Blocked Out	Total			6-Hour Man Days	Ribes	National Forest	O & C	Total	Private	6-Hour Man Days			Ribes Eradicated					
												National Forest	O & C	Total	Private	National Forest	O & C	Total	Private	
National Forest	Worked	Blocked Out	Total	6-Hour Man Days	Ribes Eradicated	6-Hour Man Days	Ribes	National Forest	O & C	Total	Private	National Forest	O & C	Total	Private	National Forest	O & C	Total	Private	
Initial Work																				
California:																				
Elmest	4,489		4,489	7,501	948,609	1.67	211	2,021		2,021	2,468	3,337		3,337	4,194	579,007		579,007	169,602	
Flumes	2,948		2,948	4,716	1,087,072	1.61	169	2,271		2,271	677	3,180		3,180	1,556	723,314		723,314	163,758	
Stemiloma	410		410	851	60,514	2.08	148	285		285	125	586		586	267	41,611		41,611	18,303	
Subtotals	7,847		7,847	13,068	2,096,195	1.57	527	4,577		4,577	3,270	7,103		7,103	5,957	1,343,932		1,343,932	352,263	
Oregon:																				
Rogue River	480		480	430	27,150	0.90	57	480		480		430		430		27,150		27,150		
Siskiyou	1,252	1,341	2,593	1,904	46,516	1.52	37	1,867	486	2,353	240	1,197	509	1,706	138	30,523	11,698	42,221	4,295	
Subtotals	1,732	1,341	3,073	2,334	73,666	1.35	94	2,347	486	2,833	240	1,627	509	2,136	138	57,673	11,698	69,371	4,295	
Totals	9,579	1,341	10,920	15,424	2,169,861	1.51	227	6,924	486	7,410	3,510	8,730	509	9,239	6,185	1,401,605	11,698	1,413,303	756,558	
Reeradication Work																				
California:																				
Elmest	1,690		1,690	1,370	47,930	0.81	28	1,036		1,036	654	790		790	580	39,934		39,934	7,995	
Flumes	4,429		4,429	2,483	583,688	0.56	127	1,272		1,272	3,157	969		969	1,514	212,593		212,593	161,046	
Elmest	5,110		5,110	1,775	152,530	0.35	30	480		480	4,510	170		170	1,505	11,650		11,650	140,870	
Stemiloma	5,005		5,005	1,623	572,117	0.72	114	3,985		3,985	1,020	3,117		3,117	908	442,841		442,841	129,276	
Sierra	2,488		2,488	1,297	457,758	1.31	228	2,488		2,488		1,297		1,297		567,758		567,758	250	
Subtotals	18,722		18,722	12,548	1,904,023	0.57	102	9,261		9,261	9,461	8,343		8,343	4,205	1,274,836		1,274,836	629,167	
Oregon:																				
Rogue River	4,571		4,571	2,700	112,828	0.90	25	4,006		4,006	565	2,010		2,010	290	81,042		81,042	29,786	
Totals	23,293		23,293	14,848	2,016,851	0.54	87	13,267		13,267	10,026	10,353		10,353	4,495	1,357,878		1,357,878	658,973	
All Workings																				
California:																				
Elmest	6,179		6,179	8,871	996,539	1.44	161	3,057		3,057	3,122	4,127		4,127	4,704	618,541		618,541	177,598	
Flumes	7,377		7,377	7,219	1,680,760	0.98	224	3,243		3,243	4,814	4,149		4,149	3,020	335,957		335,957	714,803	
Elmest	5,110		5,110	1,775	152,530	0.35	30	480		480	4,510	170		170	1,505	11,650		11,650	140,870	
Stemiloma	5,415		5,415	4,476	652,631	0.83	117	4,270		4,270	1,145	3,703		3,703	773	448,452		448,452	148,179	
Sierra	2,488		2,488	1,297	457,758	1.31	228	2,488		2,488		1,297		1,297		567,758		567,758	250	
Subtotals	26,569		26,569	25,671	4,000,218	0.99	151	13,854		13,854	12,731	15,446		15,446	10,132	2,818,768		2,818,768	1,361,506	
Oregon:																				
Rogue River	5,051		5,051	2,730	133,978	0.54	28	4,486		4,486	565	2,440		2,440	290	110,192		110,192	29,786	
Siskiyou	1,252	1,341	2,593	1,904	46,516	1.52	37	1,867	486	2,353	240	1,197	509	1,706	138	30,521	11,598	42,221	4,295	
Subtotals	6,303	1,341	7,644	4,634	180,494	0.74	70	6,353	486	6,839	805	3,637	509	4,145	468	140,715	11,598	152,313	34,081	
Totals	32,872	1,341	34,213	30,302	4,186,712	0.92	127	20,201	486	20,687	13,536	19,083	509	19,592	10,680	2,759,483	11,598	2,771,081	1,435,531	

TABLE 2
SUMMARY OF RIBES ERADICATION BY THE FOREST SERVICE 1933-1944

National Forest	Acres				Per Acre Worked		Acres Covered				Ownership				Status				Acres Ribes-Free At Re-eradication		
	Worked	Blocked Out	Total	6-Hour Man Days	Ribes Eradicated	6-Hour Man Days	Ribes	Federal			6-Hour Man Days			Ribes Eradicated							
								National Forest	O & C	Total	Private	National Forest	O & C	Total	Private	National Forest	O & C	Total		Private	
Initial Work																					
California:	19,050	893	19,943	21,149	2,102,474	1.11	110	5,767		5,767	14,176	6,038		6,038	15,111	955,666		955,666		1,146,806	
Lassen	17,688	1,399	19,087	16,936	1,941,142	0.95	110	2,716		2,716	16,371	2,268		2,268	14,668	302,147		302,147		1,638,995	
Flumina	59,996	9,151	69,147	61,787	9,937,744	1.03	167	59,275		59,275	9,874	44,299		44,299	17,528	7,765,859		7,765,859		2,231,875	
Rio Grande	35,203	5,113	40,316	35,021	5,968,575	0.68	161	40,058		40,058	3,584	19,123		19,123	6,898	5,827,361		5,827,361		1,181,214	
Stemolans*	49,411	9,121	58,532	32,122	7,632,934	0.55	159	51,739		51,739	6,123	23,255		23,255	8,867	5,735,570		5,735,570		2,104,364	
Sierra	11,960	483	12,443	36,461	7,846,006	0.95	66	11,067		11,067	1,376	34,110		34,110	2,391	7,202,352		7,202,352		843,656	
Subtotal	198,508	26,168	224,676	194,476	35,695,877	0.99	167	170,622		170,622	52,154	129,051		129,051	65,423	27,788,967		27,788,967		6,905,910	
Oregon:																					
Rogue River	772		772	1,058	130,639	1.37	169	772		772		1,058		1,058		130,639		130,639		130,639	
Siskiyou	2,715	3,566	6,281	3,504	115,070	1.31	43	3,709	1,206	4,915	1,366	2,739	521	3,320	224	95,008	13,163	109,171	6,899	6,899	
White Pine Plantation	145	535	680	373	124,744	2.57	850	680		680		373		373		124,744		124,744		124,744	
Subtotal	3,632	4,101	7,733	4,935	371,443	1.37	102	5,160	1,206	6,366	1,365	4,230	521	4,751	224	351,361	13,163	364,524	6,899	6,899	
Totals	202,140	30,269	232,409	199,411	37,067,320	1.00	185	175,783	1,206	176,989	53,520	133,283	521	133,804	65,647	28,140,348	13,163	28,153,511	8,913,809	8,913,809	
Reeradication Work																					
California:																					
Elmest	1,690		1,690	1,370	47,930	0.81	28	1,036		1,036	654	790		790	580	39,934		39,934		7,996	
Lassen	4,779		4,779	2,346	584,095	0.54	43	622		622	4,157	261		261	2,085	5,014		5,014		139,081	
Flumina	65,127		65,127	39,052	4,604,038	0.53	31	36,602		36,602	39,125	22,591		22,591	16,464	2,137,078		2,137,078		2,303,490	
Rio Grande	51,125		51,125	3,117	141,041	0.60	41	28,928		28,928	22,197	18,468		18,468	1,106,134		1,106,134		1,106,134		1,010,947
Stemolans	68,875		68,875	4,300,744	2,117,511	0.53	139	49,216		49,216	19,340	22,266		22,266	24,572	3,126,465		3,126,465		17,402	
Sierra	41,059		41,059	29,438	9,217,578	0.72	237	34,574		34,574	3,457	8,485	25,771		25,771	8,915,120		8,915,120		81,140	
Subtotal	233,255		233,255	140,490	21,058,134	0.60	90	151,297		151,297	81,958	90,840		90,840	90,840	59,950	1,931,123		1,931,123		55,722
Oregon:																					
Rogue River	9,387		9,387	6,242	162,171	0.70	149	8,747		8,747	1,040	6,017		6,017	525	149,957		149,957		32,780	
White Pine Plantation	212		212	228	39,957	1.08	141	212		212		228		228		39,957		39,957		395	
Subtotal	9,599		9,599	6,470	202,128	0.71	163	8,959		8,959	1,040	6,245		6,245	525	189,914		189,914		32,780	
Totals	242,854		242,854	147,760	21,260,262	0.61	89	159,856		159,856	82,998	97,085		97,085	50,175	165,151,037		165,151,037		5,993,791	
All Workings																					
California:																					
Elmest	20,740		20,740	22,519	2,150,404	1.09	104	6,303		6,303	14,830	6,828		6,828	15,691	935,602		935,602		1,154,802	
Lassen	22,487		22,487	13,282	2,145,237	0.85	35	3,138		3,138	20,528	2,525		2,525	18,753	307,161		307,161		6,121	
Flumina	82,123		82,123	44,876	14,518,712	0.80	116	95,877		95,877	38,999	66,899		66,899	30,028,947		4,535,428		4,535,428		29,263
Rio Grande	89,628		89,628	44,747	59,661	0.98	101	68,586		68,586	25,761	37,581		37,581	19,083	6,933,555		6,933,555		2,152,161	
Stemolans	116,286		116,286	12,407	56,665	12,150,304	0.59	103	101,245		26,113	46,281		46,281	24,933	9,122,051		9,122,051		17,408	
Sierra	53,019		53,019	25,202	17,713,578	1.24	131	53,041		53,041	7,801	29,681		29,681	6,116	17,712		17,712		380	
Subtotal	295,853		295,853	334,345	37,758,011	0.78	334	324,913		324,913	134,112	219,813		219,813	253,833	115,073	1,788,050		1,788,050		55,450
Oregon:																					
Rogue River	10,159		10,159	7,600	133,566	0.75	58	9,119		9,119	1,040	7,075		7,075	525	650,586		650,586		32,780	
Siskiyou	2,715		2,715	3,566	115,070	1.31	43	3,709	1,206	4,915	1,366	2,739	521	3,320	224	95,008	13,163	109,171	6,899	6,899	
White Pine Plantation	145		145	173	124,744	2.57	850	145		145		173		173		124,744		124,744		124,744	
Subtotal	13,211		13,211	11,745	374,086	0.89	65	13,320	1,206	14,526	2,406	10,475	521	10,996	742	811,295	13,163	824,458	39,679	39,679	
Totals	309,064		309,064	346,110	38,132,097	0.78	334	338,233	1,206	339,439	136,518	230,388	521	230,889	115,812	1,899,385	13,163	1,912,548	44,013,600	56,044	

TABLE 3

SUMMARY OF CHECKING ON THE FOREST SERVICE PROJECT - 1944

Operation	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days
Oregon												
Rogue River	6,670	5.6	127 3/8	-	-	-	640	4.8	10 2/8	7,310	5.6	137 5/8
Siskiyou	893	4.4	28 2/8	3,259	4.9	76 6/8	-	-	-	4,152	4.8	105
Totals	7,563	5.5	155 5/8	3,259	4.9	76 6/8	640	4.8	10 2/8	11,462	5.3	242 5/8
California												
Klamath	3,577	4.7	96 7/8	2,945	3.2	46 2/8	10,483	5.1	199	17,005	4.6	342 1/8
Plumas	522	4.3	7 7/8	2,494	2.4	29	12,081	2.7	167 6/8	15,097	2.7	204 5/8
Stanislaus	775	2.7	16 5/8	-	-	-	12,560	2.7	174 2/8	13,335	2.7	190 7/8
Eldorado	360	2.8	4 4/8	-	-	-	13,894	3.3	173	14,254	3.3	177 4/8
Sierra	1,850	5.1	55 4/8	-	-	-	660	4.7	17 4/8	2,510	5.0	73
Totals	7,084	4.4	181 3/8	5,439	2.8	75 2/8	49,678	3.4	731 4/8	62,201	3.4	988 1/8
Pacific Coast Region												
Totals	14,647	5.0	337 1/8	8,698	3.6	152	50,318	3.4	741 6/8	73,663	3.7	1,230 6/8

TABLE 4
(Omnibus Table 2, Sheet 2)

SUMMARY OF RIBES ERADICATION ON NATIONAL FOREST LAND IN 1944
PACIFIC COAST REGION

	First Working			Second and Other Workings				All Workings			
	Acres	Per Acre		Acres	Per Acre		Acres Second Working Only	Acres	Ribes	Per Acre	Man Days
		Ribes	Man Days		Ribes	Man Days					
National Forests											
Klamath	2,021	286	1.65	1,036	39	0.76	1,036		3,057	202	1.35
Lassen	206	173	1.02						206	173	1.02
Plumas	4,337	304	1.37	1,272	167	0.76	80		5,609	273	1.23
Eldorado	160	50	0.81	1,592	26	0.44	1,112		1,752	28	0.47
Stanislaus	285	146	2.06	3,985	111	0.79	1,020		4,270	113	0.87
Sierra				2,488	228	1.33	940		2,488	228	1.33
California Subtotals	7,009	283	1.45	10,373	126	0.85	4,188		17,382	189	1.10
Rogue River	480	57	0.90	4,006	21	0.50	1,598		4,486	25	0.54
Siskiyou	1,867	16	0.64	36	78	0.86	36		1,903	18	0.65
Oregon Subtotals	2,347	25	0.69	4,042	21	0.50	1,634		6,389	22	0.57
Grand Totals	9,356	218	1.26	14,415	96	0.76	5,822		23,771	144	0.96

TABLE 5
(Omnibus Table 2A, Sheet 2)

SUMMARY OF RIBES ERADICATION ON NATIONAL FOREST LAND 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

(Net Figures Used)

	First Working			Second and Other Workings			All Workings		
	Per Acre		Acres	Per Acre		Acres	Per Acre		
	Ribes	Man Days		Ribes	Man Days		Ribes	Man Days	
National Forests									
Klamath	5,767	166	1.05	1,036	39	0.76	6,803	146	1.00
Lassen	9,865	103	0.61	1,997	18	0.28	11,862	89	0.55
Plumas	84,036	137	0.72	42,971	63	0.60	127,007	112	0.68
Eldorado	66,623	143	0.50	37,298	41	0.61	103,921	106	0.54
Stanislaus	76,784	105	0.43	76,157	85	0.44	152,941	95	0.43
Sierra	46,705	388	1.89	35,459	256	0.76	82,164	331	1.40
California Subtotals	289,780	170	0.78	194,918	102	0.57	484,698	142	0.69
Klamath	3,739	112	1.23				3,739	112	1.23
Rogue River	65,905	222	0.60	29,297	41	0.40	95,202	166	0.54
Siskiyou	19,117	18	0.35	36	78	0.86	19,153	19	0.35
Siuslaw	680	183	0.55	212	141	1.08	892	173	0.67
Oregon Subtotals	89,441	174	0.57	29,545	42	0.40	118,986	141	0.53
Grand Totals	379,221	171	0.73	224,463	94	0.54	603,684	142	0.66

TABLE 6
SUMMARY OF RIBES ERADICATION BY AGENCY ON NATIONAL FOREST LAND 1925-1944

State	Acreage Of National Forest Land In Control Area	Calendar Year	Acreage Worked By										Total Acreage Worked By All Agencies			Total Acreage According To Present Ownership (Initial Erad.)	Unworked Acreage
			Forest Service			Bureau			O & C								
			Initial Work	Reerad- ication	Total	Initial Work	Reerad- ication	Total	Initial Work	Reerad- ication	Total	Initial Work	Reerad- ication	Total			
California	884,272	1926 to 1943	166,045	142,036	308,081	117,096	42,549	159,645				283,141	184,585	467,726	289,780	594,492	
		1944	4,577	9,261	13,838	2,432	1,112	3,544				7,009	10,373	17,382			
	Total	- - - - -	170,622	151,297	321,919	119,528	43,661	163,189				290,150	194,958	485,108			
Oregon	225,127	1925 to 1943	2,792	4,553	7,345	78,165	22,676	100,841	8,746			8,746	89,703	27,229	116,932	89,441*	135,686
		1944	2,347	4,006	6,353					36	36	2,347	4,042	6,389			
	Total	- - - - -	5,139	8,559	13,698	78,165	22,676	100,841	8,746	36	8,782	92,050	31,271	123,321			
Total Pacific Coast Region	1,109,399		175,761	159,856	335,617	197,693	66,337	264,030	8,746	36	8,782	362,200	226,229	608,429	379,221	730,178	

*Excludes 2,609 acres of initial work in abandoned Mt. Hood unit.

PART V

BLISTER RUST CONTROL BY THE NATIONAL PARK SERVICE

Financial Project BLR-5

By

Frank A. Patty, Pathologist, P-3

PURPOSE

The purpose of this project is to protect from white pine blister rust the recreational, esthetic, or park values of the white pine stands that grow on National Park lands.

COOPERATIVE AGREEMENTS

The blister rust control program of the National Park Service followed the same general pattern as in 1943. The cooperative agreements existing between Yosemite, Sequoia, and Kings Canyon National Parks, and the Bureau of Entomology and Plant Quarantine were continued. The Bureau recruited all camp superintendents, foremen, and laborers for the National Park Service blister rust control camps.

LOCATION AND ORGANIZATION OF WORK

Four blister rust control camps were operated by the National Park Service: two in Yosemite and one each in Sequoia and Kings Canyon National Parks.

Assistant Superintendent Daniel J. Tobin administered the camps in Sequoia and Kings Canyon National Parks. Maurice E. Thede, Associate Regional Forester, Region 4, was in charge of the blister rust control camps in Yosemite National Park. Mr. Thede was moved from San Francisco to Yosemite to direct the forestry work in the absence of Park Forester Emil F. Ernst, now on military leave. The Bureau's representatives supervised the eradication and checking work in the field. Labor recruited in California, Arizona and several mid-western states came from the only available source: namely, the 16 and 17 year old high school students. This labor was inexperienced and had to be trained and conditioned for ribes eradication as well as for fire fighting, camp life, and woodsmanship.

School teachers were selected for checkers this season and were the best quality personnel that we have had since before the war. Although inexperienced, these men learned quickly and performed their assignments well. An especial advantage in using teachers as checkers is the development of these men for foremen and superintendents' positions. In addition to their checking work, checkers furnished valuable assistance to the eradication personnel. A few camps lacked sufficient supervisory personnel and checkers were substituted to enable efficient operation.

In Sequoia and Kings Canyon National Parks a contract was let for feeding the men, whereas in Yosemite the National Park Service managed the kitchens and messhalls. The procurement of food and cooks proved to be much easier than it was last season,

Brush aprons were furnished the eradicators whenever they had to spend much time working in dense patches of whitethorn brush. The protection afforded the men's knees and legs by brush aprons materially reduced injuries and the loss of time which are common to men who work unprotected in whitethorn brush thickets.

LOCATION, SIZE, AND OPERATING DATES OF PARK SERVICE BRC CAMPS

National Park	Location of Camp	Size of Camp	Operating Period
Yosemite	Crane Flat	60 workers	June 23 - Sept. 1
	Wawona	40 workers	June 6 - Aug. 11
Sequoia	Red Fir	45 workers	June 13 - Aug. 29
Kings Canyon	Cedar Springs	35 workers	June 19 - Aug. 17

Yosemite National Park

The Crane Flat camp occupied the same site that it did last season; however, Wawona instead of Eight Mile was chosen for the location of the other camp. A dormitory at Wawona belonging to the park concessionaire was converted into a blister rust control camp. The personnel turnover in Yosemite National Park was negligible until the time the men started receiving calls for fire fighting duty. Although few fires actually occurred in Yosemite National Park, frequent requests for men by the State Division of Forestry and the adjacent National Forests caused the loss of much time from the job. In addition to the time lost on the fires, equally as much was lost by resulting compensatory time and poison oak infection. At first the boys showed a great deal of enthusiasm for fire fighting, but as soon as the novelty wore off many would resign to keep from going to another fire. When the Wawona crew returned from a fire on the Sierra National Forest, so many of the members quit that it was necessary to close the camp the next week.

The crews at the Wawona camp were trained on initial eradication where ribes were dense; however most of the season was spent covering areas that had been initially worked in 1939. The ribes regeneration in most instances was only moderate and there were no serious ribes eradication problems.

The Crane Flat camp worked in the vicinity of Sugar Pine Pass on reeradication in old logged-over lands. In addition to having excellent sugar pine reproduction, these lands are covered with dense brush and a fairly heavy ribes regrowth. It was in this area that brush aprons were furnished the men to protect them from the sharp spines of whitethorn brush. The caterpillar tractor equipped with drum and ribes grapple hook started working on Trumbull Ridge about the middle of July and continued through October. It was used wherever numerous exceptionally large bushes were found in accessible places.

To remove 560,840 ribes on 3,259 acres, 4,584 man days were used. These totals include the work done with the powered grapple hook.

Recommendation: A sixty-man camp should be established at Crane Flat again next season to keep abreast of the reeradication work that is necessary, and a forty-man camp should be established at Wawona to complete the reeradication

in that vicinity and north along the Wawona Road. The caterpillar tractor equipped with drum and ribes grapple hook should continue where it left off last season. There is sufficient work to keep this equipment busy for several seasons in the Crane Flat area.

Sequoia National Park

A forty-five man blister rust control camp was established at Red Fir and operated from June 13 to August 29. All work of this camp was initial eradication. The crews started west of and joined the areas that were covered in 1943. The terrain was very rough and precipitous and the ribes populations the heaviest yet encountered in mature timber type. The streams were heavily populated with large Ribes nevadense bushes. Crews worked the streams before working the upland.

During the season 205,796 ribes plants were destroyed on 1,080 acres and 2,037 man days were expended to do the job.

Ribes eradication in 1945 should be continued on the areas west and south of the ones worked this season. The camp can operate from Red Fir.

Kings Canyon National Park

A thirty-five man blister rust control camp was established at the old Cedar Springs CCC camp site and operated from June 19 to August 17. All work outlined for the camp was reeradication. Part of the area had been logged before the Park Service received control of the land and the original ribes population was very dense. On some of the logged land ribes regeneration was heavy. On the other hand, very few ribes were found in the timbered areas. Except for a medium cover of brush on the logged lands and a few rockbound plants there were no eradication problems.

The Cedar Springs camp spent the entire season on reeradication, utilizing 1,289 man days to destroy 155,409 ribes plants on 1,032 acres.

The reeradication work was not brought up-to-date in this area and the camp will be needed again next season.

TABLE 1
SUMMARY OF RIBES ERADICATION BY THE NATIONAL PARK SERVICE IN 1944*

National Park	Acres			8-Hour Man Days	Ribes Eradicated	Per Acre Worked	
	Worked	Blocked Out	Total			8-Hour Man Days	Ribes
Initial Work							
Yosemite	43		43	1,351	310,870	31.42	7,230
Sequoia	1,080		1,080	2,037	205,796	1.89	191
Totals	1,123		1,123	3,388	516,666	3.02	460
Reeradication							
Yosemite	3,216		3,216	3,233	249,970	1.01	78
Kings Canyon	1,032		1,032	1,284	155,409	1.24	151
Totals	4,248		4,248	4,517	405,379	1.06	95
All Workings							
Yosemite	3,259		3,259	4,584	560,840	1.41	172
Kings Canyon	1,032		1,032	1,284	155,409	1.24	151
Sequoia	1,080		1,080	2,037	205,796	1.89	191
Totals	5,371		5,371	7,905	922,045	1.47	172

*This table is also a summary of ribes eradication on National Park land in 1944 since all land worked by the Park Service was National Park land.

TABLE 2
SUMMARY OF RIBES ERADICATION BY THE NATIONAL PARK SERVICE 1933-1944

National Park	Acres			8-Hour Man Days	Ribes Eradicated	Per Acre Worked		Ownership Status						Acres Ribes-Free At Re-eradication
	Worked	Blocked Out	Total			8-Hour Man Days	Ribes	Acres Covered		8-Hour Man Days		Ribes Eradicated		
								Federal	Private	Federal	Private	Federal	Private	
Initial Work														
Crater Lake	406	3,226	3,632	412	130,162	1.01	321	3,632		412		130,162		
Lassen Volcanic	5,722	8,168	13,890	5,270	715,338	0.92	125	13,750	140	5,215	55	700,361	14,977	
Yosemite*	42,821	6,536	49,357	81,597	10,988,415	1.91	257	49,357		81,597		10,988,415		
Kings Canyon	3,241		3,241	5,132	836,010	1.58	258	3,241		5,132		836,010		
Sequoia	10,960		10,960	11,118	1,435,281	1.01	131	10,960		11,118		1,435,281		
Totals	63,150	17,930	81,080	103,529	14,105,206	1.54	223	80,940	140	103,474	55	14,090,229	14,977	
Reeradication														
Crater Lake	350		350	81	13,430	0.23	38	350		81		13,430		795
Lassen Volcanic	1,975		1,975	1,080	99,218	0.55	50	1,960	15	1,074	6	98,480	738	
Yosemite**	13,670		13,670	18,115	2,579,640	1.33	189	13,670		18,115		2,579,640		3,927
Kings Canyon	1,032		1,032	1,284	155,409	1.24	151	1,032		1,284		155,409		
Totals	17,027		17,027	20,560	2,847,697	1.21	167	17,012	15	20,554	6	2,846,959	738	4,722
All Workings														
Crater Lake	756	3,226	3,982	493	143,592	0.65	190	3,982		493		143,592		795
Lassen Volcanic	7,697	8,168	15,865	6,350	814,556	0.82	106	15,710	155	6,289	61	798,841	15,715	
Yosemite	56,491	6,536	63,027	99,712	13,568,055	1.77	240	63,027		99,712		13,568,055		3,927
Kings Canyon	4,273		4,273	6,416	991,419	1.50	232	4,273		6,416		991,419		
Sequoia	10,960		10,960	11,118	1,435,281	1.01	131	10,960		11,118		1,435,281		
Totals	80,177	17,930	98,107	124,089	16,952,903	1.55	211	97,952	155	124,028	61	16,937,188	15,715	4,722

*In addition, 8,206 acres, 5,577 man days, and 1,711,851 ribes on lands worked by the Forest Service and the Bureau of Entomology and Plant Quarantine are now in Yosemite National Park.

**In addition, 480 acres, 326 man days, and 298,657 ribes on lands worked by the Bureau of Entomology and Plant Quarantine are now in Yosemite National Park.

TABLE 3

THE STATUS OF RIBES ERADICATION IN THE NATIONAL PARKS OF THE
PACIFIC COAST REGION BY PRIORITY CLASSES AS OF DECEMBER 31, 1944

National Park	Total All Classes Acres	CLASS A				CLASS B				CLASS C	
		Total Acres	Un- worked Acres	Initial Working Acres	Reerad- ication Acres	Total Acres	Un- worked Acres	Initial Working Acres	Re- erad. Acres	Total Acres	Un- worked Acres
Yosemite	146,300	77,400	23,519	53,881	13,820	34,600	30,918	3,682	330	34,300	34,300
Sequoia Kings Canyon	99,900	21,100	10,140	10,960	-	50,600	50,600	-	-	28,200	28,200
Lassen	22,430	18,430	15,189	3,241	1,032	4,000	4,000	-	-	-	-
Crater	17,932	11,563	4,042	7,521	1,665	6,369	-	6,369	310	-	-
Grand Totals	3,782	3,782	150	3,632	350	-	-	-	-	-	-
	290,344	132,275	53,040	79,235	16,867	95,569	85,518	10,051	640	62,500	62,500

TABLE 4

SUMMARY OF CHECKING ON THE NATIONAL PARK SERVICE PROJECT - 1944

	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days
Operation												
Yosemite National Park	3,007	5.0	60 3/8	-	-	-	1,873	3.6	34 5/8	4,880	4.5	95
Sequoia National Park	1,931	4.5	40 6/8	904	2.5	10 2/8	-	-	-	2,835	3.8	51
Totals	4,938	4.8	101 1/8	904	2.5	10 2/8	1,873	3.6	34 5/8	7,715	4.2	146

TABLE 5
(Omnibus Table 2A, Sheet 3)

SUMMARY OF RIBES ERADICATION ON NATIONAL PARK LAND 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

	(Net Figures Used)					
	First Working			Second and Other Workings		
	Acres	Per Acre		Acres	Per Acre	
National Parks		Ribes	Man Days		Ribes	Man Days
Crater Lake	3,632	36	0.11	350	38	0.23
Lassen Volcanic	13,750	51	0.38	1,960	50	0.55
Yosemite	57,563	222	1.51	14,150	203	1.30
Kings Canyon	3,241	258	1.58	1,032	151	1.24
Sequoia	10,960	131	1.01			
Totals	89,146	177	1.22	17,492	180	1.19
				106,638	178	1.22

PART VI

BLISTER RUST CONTROL BY THE OREGON AND CALIFORNIA REVESTED LANDS ADMINISTRATION

Financial Project BLR-6

By

Lyle N. Anderson, Agent, P-2

PURPOSE

The purpose of this project is to protect from white pine blister rust those white pine stands growing on the lands managed by the Oregon and California Revested Lands Administration of the United States Department of the Interior. Since all O and C lands are in Oregon, the project is confined to that state.

ORGANIZATION AND LOCATION OF CONTROL WORK

The Bureau of Entomology and Plant Quarantine is responsible for the leadership and coordination of the blister rust control program on lands of all classes of ownership throughout the white pine growing regions of the country. The Memorandum of Understanding between the Bureau and the O and C Revested Lands Administration, in force since 1941, was continued during 1944.

Ribes eradication activities operated with O and C funds during the season of 1944 were under the supervision of Mr. Floyd L. Scott, district forester of the O and C Administration at Medford. Technical supervision of the field work and checking were handled by Bureau personnel.

The Beaver Creek camp site in the Pinehurst unit was occupied again this year and crews from the camp continued initial ribes eradication. This area is adjacent to the Rogue River National Forest, bordering it on the south. On August 18 this camp was moved from Pinehurst to the Siskiyou National Forest, where it occupied the old Spaulding Mill site at Swede Basin.

WORK PERFORMED AND RESULTS ACCOMPLISHED

Ribes Eradication

A crew of 25 high school boys started the eradication of ribes bushes at the Pinehurst camp on June 7. This number was increased to 40 by the end of June. The O and C Administration was fortunate in having a camp superintendent and two foremen who had worked this area during the previous season. The crews were trained in a dense concentration of ribes in the burned-over area on the east side of Little Chinquapin Mountain. As the men gained proficiency in crew formation and digging practices, they were shifted to areas supporting fewer ribes. They were then able to complete the eradication work along the south and west sides of the mountain where

rust had been found. This procedure left the unworked portion of the unit in a block. A total of 95,398 ribes bushes were removed from 2,469 acres through the use of 1,130 man days.

On August 18 the Pinehurst camp was closed and the 10 remaining eradicators were moved to the Siskiyou National Forest. The camp move was instigated by the finding of blister rust infection on both ribes and native sugar pines within the area where 240,000 sugar pine seedlings had been planted in 1943. Some of the previous work in the Swede Basin unit had not met control standards at the time of initial eradication, hence it was not practical to delay the reeradication work any longer if the plantation was to be given protection from the rust. The Spaulding Mill camp also provided the checkers a base from which to post check the area. The eradication crews removed 4,049 ribes from 126 acres with an expenditure of 53 man days in the two weeks that the camp was in operation.

Checking

High school boys were again employed on checking work and the same methods were used as in previous years. An experienced checker foreman closely supervised the four checkers working under him. Even with such close direction of the work accurate results were difficult to obtain. All sections covered by ribes eradication crews were given either an advance check or a post check before eradication work was started.

The regular check made on the McKinley Nursery of the Siuslaw National Forest disclosed that portions of the 150 acres worked during 1942 and 1943 do not meet the control standards. There also remain 150 acres of initial ribes eradication work to be done before the nursery will be in a sanitary condition.

FUNDS EXPENDED

Regular funds expended by the O and C Administration for eradication, checking and reconnaissance for the calendar year of 1944 were \$27,217.

RECOMMENDATIONS FOR FUTURE WORK

It is recommended that the Swede Basin Area of the Siskiyou National Forest be given priority above all others for the 1945 season. Reeradication is urgently needed and there is sufficient work to maintain two 50-man blister rust control camps for the entire field season. Approximately 14,000 acres of reeradication and 2,000 acres of initial work can be conveniently reached from the two available camp sites. The practice of working those areas most subject to blister rust damage should be continued. Should a sudden outbreak of the rust appear in any part of the control units, then that area or portion of an area should be given priority of work.

TABLE 1

SUMMARY OF RIBES ERADICATION BY THE OREGON & CALIFORNIA REVESTED LANDS ADMINISTRATION IN 1944

Control Operation	Acres		Per Acre Worked	8-Hour Man Days	Ribes Eradicated	Ownership Status													
	Worked	Blocked Out				Acres Covered		8-Hour Man Days		Ribes Eradicated									
						Federal	National Forest	O & C	Total	Federal	National Forest	O & C	Total	Private					
Initial Work																			
Rogue River N. F.	1,854	615	2,469	1,130	95,398	0.61	51	694	1,775	377	377	753	-	30,912	30,912	64,486			
Reeradication Work																			
Siskiyou N. F.	126		126	53	4,049	0.42	32	36	90	126	31	22	53	2,814	1,235	4,049			
All Workings																			
Totals	1,980	615	2,595	1,183	99,447	0.60	50	36	784	820	1,775	31	399	430	753	2,814	32,147	34,961	64,486

TABLE 2

SUMMARY OF RIBES ERADICATION BY THE OREGON & CALIFORNIA REVESTED LANDS ADMINISTRATION 1940-1944

Control Operation	Acres		Per Acre Worked	8-Hour Man Days	Ribes Eradicated	O w n e r s h i p S t a t u s													
	Worked	Blocked Out				Acres Covered			8-Hour Man Days			Ribes Eradicated							
						Total	8-Hour Man Days	Ribes Eradicated	National Forest	O & C	Total	Private	National Forest	O & C	Total				
Rogue River N. F.	2,849	1,095	3,944	2,282	179,659	0.80	63	1,384	1,384	2,560		1,053	1,053	1,229		78,612	78,612	101,047	
Siskiyou N. F.	7,156	14,115	21,271	6,261	441,587	0.87	62	8,746	11,143	19,889	1,382	2,266	3,684	5,990	311	162,511	265,302	427,813	13,774
Sisalaw N. F.																			
Nursery Sanitation	150		150	273	8,339	1.82	56		110	110	40		162	162	111		5,462	5,462	2,877
Totals	10,155	15,210	25,365	8,816	629,585	0.87	62	8,746	12,637	21,383	3,982	2,266	4,899	7,165	1,651	162,511	349,376	511,887	117,698
Initial Work																			
Reeradication Work																			
Siskiyou N. F.	126		126	53	4,049	0.42	32	36	90	126		31	22	53		2,814	1,235	4,049	
All Workings																			
Rogue River N. F.	2,849	1,095	3,944	2,282	179,659	0.80	63	1,384	1,384	2,560		1,053	1,053	1,229		78,612	78,612	101,047	
Siskiyou N. F.	7,282	14,115	21,397	6,314	445,636	0.87	61	8,782	11,233	20,015	1,382	2,297	3,706	6,003	311	165,325	266,537	431,862	13,774
Sisalaw N. F.																			
Nursery Sanitation	150		150	273	8,339	1.82	56		110	110	40		162	162	111		5,462	5,462	2,877
Totals	10,281	15,210	25,491	8,869	633,634	0.86	62	8,782	12,727	21,509	3,982	2,297	4,921	7,218	1,651	165,325	350,611	515,936	117,698

TABLE 3
SUMMARY OF CHECKING ON THE O & C PROJECT - 1944

Operation	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent Of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days
Rogue River	320	4.5	5 1/8	2,660	4.7	47 6/8	-	-	-	2,980	4.7	52 7/8
Siskiyou	-	-	-	160	5.2	2 5/8	2,429	5.6	46 2/8	2,589	5.6	48 7/8
McKinley Nursery	300	3.0	5 1/8	-	-	-	-	-	-	300	3.0	5 1/8
Totals	620	3.8	10 2/8	2,820	4.7	50 3/8	2,429	5.6	46 2/8	5,869	5.0	106 7/8

TABLE 4
(Omnibus Table 2, Sheet 5)

SUMMARY OF RIBES ERADICATION ON O & C LANDS, OREGON IN 1944
PACIFIC COAST REGION

Control Operation	First Working			Second and Other Workings				All Workings		
	Acres	Per Acre		Acres	Per Acre		Acres Second Working Only	Acres	Per Acre	Man Days
		Ribes	Man Days		Ribes	Man Days				
Rogue River N. F.	694	45	0.54					694	45	0.54
Siskiyou N. F.	486	24	1.05	90	14	0.24	90	576	22	0.92
Totals	1,180	36	0.75	90	14	0.24	90	1,270	35	0.71

TABLE 5
(Omnibus Table 2A, Sheet 5)

SUMMARY OF RIBES ERADICATION ON O & C LANDS, OREGON 1918-1944 (INCLUSIVE)
PACIFIC COAST REGION

(Net Figures Used)

Control Operation	First Working			Second and Other Workings				All Workings		
	Acres	Per Acre		Acres	Per Acre		Acres	Per Acre	Man Days	Man Days
		Ribes	Man Days		Ribes	Man Days				
Rogue River N. F.	6,778	41	0.33				6,778	41	0.33	
Siskiyou N. F.	31,888	14	0.25	90	14	0.24	31,978	14	0.25	
McKinley Nursery	110	50	1.47				110	50	1.47	
Totals	38,776	19	0.27	90	14	0.24	38,866	19	0.27	

SCOUTING AND DISEASE SURVEY

By

Douglas R. Miller, Forester, P-3

Scouting for white pine blister rust, *Cronartium ribicola*, in the Pacific Coast Region was continued during the 1944 season. The aim of the program was the same as that of preceding years, namely: first, to ascertain whether or not a long distance spread of the rust had occurred from aecio-spores produced in the north; secondly, to determine the amount of intensification of the rust on pine in those areas previously infected; thirdly, to retard the development of the rust as much as possible by eliminating all cankers located, and fourthly, to gather data on which to base ribes eradication work for certain local areas, which present conditions highly favorable to the incidence and development of the rust.

The status of the known spread of blister rust at the beginning of the 1944 scouting season in the Pacific Coast Region was as follows:

Oregon

Blister rust was discovered in northwestern Oregon during the summer of 1925. Since then, it has spread southward throughout the western white and sugar pine stands of both the Coast and Cascade Ranges. In southern Oregon at locations favorable to rust development it is not uncommon to find the disease generally present on five-needled pines.

California

Blister rust on both ribes and pines was discovered in California in 1936. At that time, the disease was confined to a narrow belt lying just south of the Oregon line on the Klamath National Forest. Weather conditions during the springs of 1937 and 1938 were favorable to aeciospore dissemination as well as to ribes infection, and the rust made a long-distance spread into both the Coast Range and Sierras. By the end of the 1943 season, many blister rust cankers on sugar pine had been found on the southern end of the Plumas National Forest a distance of about 165 miles south of the Oregon line. Infected ribes had been found along the coast at a point 265 miles south of the Oregon line.

Table 1 presents the yearly known southward spread of the rust, measured in miles from the Oregon border, and gives the generic host involved for each of the two sugar pine areas in California.

TABLE 1

ANNUAL SPREAD OF BLISTER RUST IN CALIFORNIA

Area	Infected Host	Southward Annual Spread in Miles from Oregon Border								
		1936	1937	1938	1939	1940	1941	1942	1943	1944
Sierra Nevada	Sugar Pine					107	165	165	165	165
	Ribes		120	160	160	160	160	160	175	240
Coast Range	Sugar Pine	4	4	4	14	42	42	42	115	115
	Ribes	6	125	125	125	125	200	210	265	265

ORGANIZATION AND METHODS OF WORK

The scouting force, during the active ribes eradication season, consisted of a small crew working part time on the Rogue River National Forest and two similar crews on the Klamath National Forest. In late August and early September, members of the Bureau's permanent personnel as well as a few seasonal employees were organized into scouting parties. These varied in size from two to twelve men and the last crew discontinued work October 20. In addition, members of the Division of Forest Pathology and of the blister rust personnel of all agencies on the various operations both in Oregon and California made observations while performing their regular duties.

The methods used in scouting and the mechanics of performing the work as well as recording the data were the same as those described in the 1942 Annual Report. Emphasis is still being placed upon the location of areas which support conditions favorable to the establishment and development of the rust. The practice, adopted in 1942, of pruning all pines examined and of removing cankers found was continued.

WORK PERFORMED AND RESULTS OBTAINED

The annual review of the charts of upper air currents and other meteorological records covering the Pacific Coast for the spring months of 1944 was made by Drs. W. W. Wagener and J. W. Kimmey of the Division of Forest Pathology. They state in part that: "...Eliminating winds during or immediately following rains, there were only two periods in the course of the spring when wind movements moderately favorable for the carriage of spores into California prevailed. These were on May 1 and 2 and on June 6, 7, and 8. During the first part of both periods, winds were favorable only from southern Oregon, and by June the peak of aeciospore production was undoubtedly already past at most of the potential spore sources. Accordingly we believe that the season cannot be rated as favorable for carrying the rust into new areas in California.

"On the other hand, if any spores were blown in there were ample rains following the north winds to cause initial infection on ribes and the intensification of the rust on this host. It would not be surprising, therefore, if occasional isolated infected spots had become established this spring."

Intensive scouting revealed ribes infection, not only in the vicinity of sporulating cankers as has been the case since 1938, but also at great distances from the nearest known infected pine. Infected ribes bushes were found along both the north slope and the crest of South Fork Mountain on the Trinity National Forest. Infected ribes were also found on the Lassen, Plumas, Tahoe, Eldorado, and Stanislaus National Forests where the zones of white pine blister rust and pinyon rust overlap. About 1,500 specimens of rust on ribes were collected for identification.

The determinations made by the Division of Forest Pathology identified some of the specimens collected at the numerous locations on the Tahoe and Eldorado National Forests to be white pine blister rust. Unfortunately most of the infected leaf samples collected from the Stanislaus National Forest as well as many specimens from the Tahoe and Eldorado

National Forests were made after an early October rain. This rain caused the telia to germinate and in the germinated condition it was not possible to identify with accuracy the specific rust responsible for the infection. Although while determinations made of infected leaf samples collected from the Stanislaus National Forest indicated that white pine blister rust might be present, they were not sufficiently clear-cut to make the identification positive. Thus there are strong indications that blister rust reached the Stanislaus National Forest during the spring of 1944.

On the basis of positive identifications made, however, the southward spread of the rust was extended 65 miles during 1944. The southernmost known infection point is located just south of the Alpine Highway in Amador County, Eldorado National Forest.

The question arises: "Where were the aeciospores produced that infected the leaves of the ribes on the Tahoe and Eldorado National Forests?" There were only two periods during the spring when winds even moderately favorable to spore dissemination occurred from northern Oregon and beyond. Both of these periods were much longer and therefore more favorable to the dissemination of those spores produced in southern Oregon and northern California than for spores produced farther north.

There were only 240 live cankers found on the Plumas National Forest and only 94 on the Lassen National Forest and of this total half or less had sporulated during the spring of 1944. Ribes infection in the immediate vicinity of these sporulating cankers was much heavier than elsewhere; but from the determinations of the rusted leaves thus far tested, the infection on ribes, other than near fruiting cankers, was about equally distributed on the Eldorado, Tahoe, Plumas, Lassen, Shasta, and Trinity National Forests. Because of the few cankers present in the Sierras and because of the general distribution of the rust on ribes, the chances of the rust being spread from the diseased pines on the Lassen and Plumas National Forests seems doubtful. It appears, therefore, that spores from some source outside the Sierras, probably from pine infection centers on the Klamath, Siskiyou, Rogue River, and Umpqua National Forests, were responsible for this infection.

OREGON

Scouting on the Umpqua National Forest

There was little scouting for white pine blister rust performed on the Umpqua National Forest. Numerous infected ribes bushes were found scattered along the roadside from the headwaters of Cow Creek to the Divide Guard Station. A few infected pines were found below Drew Lake.

Scouting in the Watson Creek-Big Camas area revealed one infection center of interest just east of Watson Creek Forest Camp. One bush of Ribes lacustre, the leaves of which were lightly infected and one bush of R. lobbi showing heavy intensification of the rust were growing about 15 chains apart. There were several cankers on the trees of western white pine in the vicinity of each bush. Many more cankers, however, were found near the bush of R. lobbi than by the bush of R. lacustre. About midway between these two bushes and scattered along the road clearing for a

distance of two to three chains were 22 Ribes cereum bushes. From one to three infected leaves per plant were found on 14 of these R. cereum bushes and several cankers on pines growing in the immediate vicinity were also found. These cankers, from all appearances, were the result of previous blister rust infection on the R. cereum bushes. This is the first time any indications have been found that R. cereum had been involved in the intensification of the rust. There were 86 cankers removed from 19 trees at this infection center.

Infection on white pine trees was noted in the Watson Creek Forest Camp and along the trail to the falls. The occasional canker appeared to have come from spores produced by R. lacustre as it was the only species found in the vicinity. The intensification of the rust on the leaves of R. lacustre was light; although when compared to rust noted on the species elsewhere in this part of the Pacific Coast Region, it was the heaviest yet seen. The bushes here appeared to be more susceptible to the rust than bushes of the same species growing to the south and west. Two infected pines were found near the end of the road leading to the Brink Forest Camp above Toketee Falls. Several infected pines were found along the road from Big Camas Ranger Station to Dog Creek which flows into the North Umpqua River. Ranger George Churchill of the Diamond Lake District observed infected white pines at most of the places just described as well as at Mowich Park and along Fish Creek just below Beaver Shelter.

Ranger Asam reported a group of trees killed by blister rust in the Gooseberry Burn along the ridge between Calf and Deception Creeks on the Twin Lakes Trail.

Mr. Nelson, who handles Timber Management on the forest, found sugar pine trees killed by blister rust along Steamboat Creek at a point about four miles above the mouth of Steelhead Creek. He also found sugar pine killed by the rust along Little River in T. 27 S., R. 1 W.

There were 235 trees examined by members of the Bureau of Entomology and Plant Quarantine and of these 37 supported 184 cankers. No record was kept of the trees examined by the personnel of the Umpqua National Forest.

Scouting on the Crater Lake National Park

The western white and white bark pines growing along the rim of Crater Lake as well as the ribes bushes found there were examined to see whether the rust had made its appearance; no rust was found. A portion of Annie Creek canyon, where rust had been found for the three previous years, was scouted. Only two infected bushes were found which indicates that the elimination of the cankers from this center is helping to keep the rust in check.

Scouting on the Rogue River National Forest

Scouting for the rust and canker elimination was started on the Rogue River National Forest early in June and was continued throughout the summer. A three-man canker elimination crew was organized and trained during the latter part of July. This crew spent most of its time searching for and removing cankers from white and sugar pines at the Ice Creek

infection center and in Buck Basin. The center at the mouth of Ice Creek was the largest yet found on this forest. It lies just outside the control unit and the white pine trees were infected by spores produced by diseased bushes of Ribes bracteosum growing along Buck and Ice Creeks.

The infection was centered on the young trees growing in a four-acre opening within the mature timber. This small area had been burned over many years ago, but young white pine trees have now restocked the burned spot. The pine reproduction ranges from two to thirty feet in height. Of the 340 trees found in and adjacent to this opening, 290 were infected with 9,217 cankers. The R. bracteosum bushes were removed from the banks of the two streams in 1943 and the only ribes observed while removing cankers were a few bushes of R. viscosissimum. The leaves of these were only lightly infected.

Additional ribes eradication work was performed on a portion of the Buck Basin area during the summer. While the crew-lane strings were still intact the canker elimination crew covered the area strip by strip hence none of the area was missed. Since the crew was called to fight fires, the work was terminated a week before the end of the season, consequently the job was not completed. Of 1,500 pines pruned and examined, 494 were infected with 3,827 cankers.

The Fredenburg Lookout area was examined during the latter part of July. This area located along the top of a ridge had been burned-over 15 or 20 years ago. Ribes are numerous in spots although sugar pine reproduction is sparse. The young sugar pine trees are making excellent growth as many of the 12-year-old trees are 12 feet high. Cankers of 1941 origin were numerous and, due to the thriftiness of the pines, the disease was making rapid growth. Many of the pines examined were growing on a south slope where ribes bushes were few and infection was comparatively light; but of the 300 trees pruned, 120 had 2,274 cankers. A more detailed description of the infection center appears on page 86 of the 1942 Annual Report.

Infected sugar pines growing along Elk Creek just outside the control unit boundary were noted. Sixteen infected trees were found while covering a three-mile section of the creek. Sugar pine trees are few in number along the stream. There were 526 cankers removed from the 16 diseased trees. Infected ribes were common.

Numerous infected bushes of R. sanguineum and two infected pines with two cankers each were located at the rock quarry beside the Ashland-Klamath Falls Highway. This infection center lies adjacent to the control unit boundary.

In addition to the areas described, infected white or sugar pines were found at Thompson Creek, Getz Mill, Stella Mountain, Hop and Top Creeks, Diamond Lake Highway, Buck Creek, and along the McAllister-Fish Lake Road. Infected ribes were also found at Perks Pasture, McCall Creek, Lake of the Woods, and the Rock Quarry on the Diamond Lake Highway. There were 16,087 cankers removed from 981 of the 3,135 white and sugar pines examined.

Scouting on the Siskiyou National Forest

Many of the known infection centers on the Siskiyou National Forest were examined during 1944 and, in addition, other centers involving one or both hosts were located for the first time.

A thorough search was made for cankers at the Bolan Lake Trail area. Many of the sugar pines are making slow growth; and, as a result, the cankers are making poor development. The pines were pruned and the remaining crown was scrutinized carefully for cankers. Although most of the cankers are of 1941 origin, some were just becoming visible because of the retarded growth of the pines. A total of 195 sugar pines, of the 450 examined, were found to have 3,624 cankers. Ribes were removed from this area in 1943.

Blister rust was found for the first time on the sugar pine in Swede Basin. This find was of special significance as the O and C Administration had planted 240,000 sugar pine seedlings there in the fall of 1943. The infection was light as most of the 55 diseased trees all infected during 1937 had only one canker each. The trees were scattered over most of one section. The ribes were removed from this area in 1940 three years after the rust made its appearance. Even though three years had elapsed between the rust's incidence and control treatment, the ribes were removed before the cankers had had time to intensify the rust. T. A. Shollenburg, the O and C camp superintendent and his staff examined about 2,400 sugar pines of which 55 trees had 89 cankers. They found numerous infected ribes. Earlier in the season infected bushes were found within and cankered pines adjacent to the boundaries of the control unit. This discovery emphasized the need of prompt reeradication work.

An infection center, located during the summer at Loretta Falls just south of the Oregon line, illustrates the rapidity of the intensification of the rust on sugar pine when conditions are favorable to the development of the disease. There are several species of ribes present, namely: Ribes sanguineum, R. marshalli, R. lobbi, R. viscosissimum, R. binominatum, R. cruentum, and R. lacustre. The leaves of R. sanguineum were nearly 100 per cent covered with telia when examined in September while the leaves of R. marshalli were almost as heavily covered. Leaves of all other species showed varying amounts of rust although R. lacustre had only a few spots of infection. There were twelve sugar pines at this location which ranged in height from one to ten feet. Three of the trees each had one or two cankers of 1937 origin which had sporulated in 1941. The rust had intensified to such an extent on the sugar pines during 1941 and 1942 that the trees were literally smothered. The cankers were so numerous they were actually competing with each other for space on the twigs and branches. Every bundle of needles on some limbs appeared to have received one or more sporidia. The only trunk cankers on these trees were those which had entered through needles growing on the stems. All twelve of the sugar pines were being killed by the numerous branch cankers and not as a result of the trunk cankers.

This rapid killing action of the rust on young sugar pine is not uncommon on small areas where bushes of either R. sanguineum or R. bracteosum are numerous. Both of these species are highly susceptible to infection

throughout the season, retain their leaves even though heavily infected until late fall, and produce an abundance of telia. They are, by far, the most hazardous species of ribes found within the control units of southern Oregon and northern California.

The sugar pine in the Run Gulch drainage of the Bolan Lake unit was found to be heavily infected in several localities. Ribes were confined largely to areas bordering old mining ditches and streams. There were but few pines at these sites making for poor host association. Wherever ribes were numerous the pines were heavily cankered as 153 infected trees had 4,900 cankers. The Run Gulch drainage received treatment from both the ribes eradication and the canker elimination crews.

The infection centers in the Reuben Mountain country were examined in 1944. Many of the bushes, at those locations where ribes occurred, were infected. Ribes glutinosum, a species closely resembling R. sanguineum, is common. It appears to be far less susceptible to blister rust than its close relative, R. sanguineum. The amount of rust on ribes was much lighter in the vicinity of Reuben Mountain than it was either on the southern end of the Siskiyou National Forest or on the Klamath National Forest.

The crew doing reconnaissance work on this area also made notes on the amount of infection present. Their findings, as well as the observations made by members of the scouting crew, indicated that little intensification of the rust has occurred on sugar pine since 1937. Thus far more cankers of that year's origin have been removed than any other age group. Because conditions favorable to the spread and development of the rust have failed to synchronize to any extent since 1937, the pine damage has not built up to any extent. A recurrence of the favorable conditions of 1937 however, and most of the pine may be lost.

Blister rust on R. marshalli and other ribes species was found at the cabin just above Tannen Lake. This was the first time the disease had been noted on R. marshalli growing in its native habitat. Infected bushes of this species, however, were found at other sites during the summer. The infected bushes at Tannen Lake were growing at an elevation of about 6,000 feet which, for this part of the state, is higher than the rust had ever been found before.

Other infection centers examined on this forest were: Althouse Creek; Kerby Ridge; sections 7, 12, 18, 23, 24, and 26 in the Bolan Lake unit; Sucker Creek; Caves Creek; Butcherknife Creek; Dutch Henry Trail; Horse Mountain; and the Bolan Lake Road.

There were 4,553 western white and sugar pines examined on the Siskiyou National Forest and of this number 597 were found infected with 14,641 cankers.

Scouting on the Oregon Caves National Monument

A few sugar pines and ribes were examined in the Oregon Caves National Monument. Blister rust was found on both pines and ribes along Noname Creek, Caves Creek, and beside the trail about 5 chains from the Chateau.

Only 25 trees were examined and four of these had 10 cankers. Ribes sanguineum was fairly common and every bush of the 25 inspected was rusted. Although there is some sugar pine type inside the National Monument it is outside present control unit boundaries.

CALIFORNIA

Scouting on the Klamath National Forest

The search for infected pine and the elimination of cankers was started on the Klamath National Forest in early May. The work continued throughout the season reaching its peak in September and terminating about mid-October. As observed elsewhere, moisture, temperature, and other factors necessary for rust development on ribes were extremely favorable during the spring and summer. The greatest volume of aeciospores ever produced in southern Oregon and northern California was liberated in April and May. This increased volume was due to the thousands of cankers of 1941 origin which sporulated for the first time in 1944.

Infection was found on every species of ribes growing in this part of the Pacific Coast Region; but, from all observations, R. sanguineum was nowhere exceeded either as to susceptibility to infection or ability to intensify the disease in the uredial stage. In September and October thousands of leaves of this species were noted completely covered with the telial stage of the rust.

During August a few inmates from the Beaver Creek and Hungry Creek State Camps (doing ribes eradication work) were trained as blister rust scouts and in the job of canker removal to supplement the work of the regular scouting crew. Canker removal work was centered in the Hungry Creek and Bumblebee Creek drainages. Many of the pines on these areas were infected before control work was started. Both these drainages supported numerous bushes of R. sanguineum and the devastating effect of rusted bushes of this species upon the surrounding sugar pine is clearly demonstrated. The rust made its entry in 1937 and the resulting cankers produced a few aeciospores during 1940 followed by a larger number in 1941. Blister rust infection on ribes was exceptionally heavy in 1941, approaching the intensity found this year. Since it was a moist fall, there was a heavy return of rust to sugar pines at most of those localities where R. sanguineum grew. There were 83,201 cankers removed from 3,392 trees in the Hungry Creek drainage. Of the infected pines, 683 or 20 per cent had stem cankers necessitating the complete removal of the trees.

The infection was more damaging in the Bumblebee Creek drainages as 2,657 of the 4,355 trees found to be infected had to be removed. Thus 61 per cent of the infected trees supported trunk cankers and of the 6,160 trees examined 42 per cent were destroyed. This drainage had 64,414 cankers eliminated. The ribes bushes had been removed from these areas during the three previous years and that part of the Hungry Creek drainage supporting the heaviest pine infection was given a second working in 1944. On local areas up to about 20 acres in size within these two drainages, from 75 to 90 per cent of all young sugar pine trees 15 feet or less in height were either already killed by the rust or were fatally affected.

Blister rust at the infection center along Spaulding Creek in section 19, T. 48 N., R. 7 W. had made rapid intensification on sugar pine. There were numerous Ribes sanguineum bushes growing along this stream when the rust was established in 1937. The ribes were not removed until 1942 or one year after the favorable spread period which occurred during 1941. The area covered by this center was smaller than that along either Bumblebee or Hungry Creeks but the number of cankers per tree was greater. The infected sugar pines along Spaulding Creek averaged 42 cankers per tree whereas at Bumblebee and Hungry Creeks the average was 15 and 25 respectively.

The greater number of cankers supported by each tree as well as the smaller acreage of infected timber involved is partially due to the pattern of distribution of R. sanguineum and sugar pine. There was a heavy concentration of this ribes species along Spaulding Creek with but few bushes farther up the slopes. In places on the north-facing slopes of the Bumblebee and Hungry Creek drainages R. sanguineum was found from the stream banks to the ridge tops. Young sugar pine trees were more numerous along Spaulding Creek than along either of the other two streams.

The Spaulding Creek infection center is another example of the rapid intensification of blister rust on sugar pines when conditions are exceptionally favorable. There were 21,235 cankers removed from 510 of the 1,000 sugar pines examined.

The ribes eradication crews of the Cinnabar Springs Camp found blister rust on many of the bushes growing along the northern boundary of the unit. This was the first time the disease had been found on either host in the Trapper Creek drainage. Ribes cruentum comprised the greater part of the ribes population on the area. The south half of section 22 supported a few bushes of R. sanguineum and most of these plants were infected. Ribes eradication work was well timed on this part of the unit as the bushes were removed before the rust was returned to the sugar pine.

The rust is beginning to intensify at an alarming rate in the Indian Creek drainage at those areas where there is good host association. Numerous bushes of R. sanguineum have made their appearance along the openings caused by the construction of the roads. There are a few other concentrations of this species in the headwaters of some of the streams, but at other than these locations it is scarce.

A high percentage of all R. sanguineum growing along the Baldy Mountain Road, the West Fork of Indian Creek Road, the Indian Creek-Slater Butte Road, and the Slater Butte-Tannen Lake Road were infected. The lower surface of from 5 to 20 per cent of the leaves on thousands of bushes was completely covered with telia before the summer was over. These bushes had been heavily infected in 1941 as many of the sugar pines growing along the road supported numerous cankers of that year's origin. When the probable damage caused by the ribes infected in 1944 is coupled with the infection caused by the 1941 spread of the rust, it is estimated that the sugar pine on a strip five chains wide on each side of all roads and streams will have been lost. There will be some exceptions where ribes bushes are few or absent, but, as a whole, the loss will be great.

Blister rust infection was located on ribes growing in and around Donomore Meadows. This center is situated on the crest of the Siskiyou Divide at an altitude of between 5,800 and 6,000 feet. Bushes of four of the five ribes species growing in the vicinity were infected. These were: Ribes viscosissimum, R. cruentum, R. binominatum, and R. lobbi. No rust was found on bushes of R. lacustre. Although young western white pine trees were numerous, no cankers were found. Since no concentrations of rusted ribes were found, it appears that the aeciospores were produced elsewhere. This center is of interest chiefly because of its elevation. The rust in 1944 was found on ribes bushes at higher altitudes in southern Oregon and northern California than at any time previously. This means that all factors necessary for ribes infection were met at these higher elevations. The comparatively open winter with a light snow pack and the early spring was probably the principal factor in allowing the bushes higher up the slopes to become rusted. Ordinarily the areas lying between 5,000 and 6,000 feet above sea level are under snow during the time the aeciospores are being disseminated. Most of the infected ribes around Donomore Meadows were in the Rogue River National Forest.

Blister rust was found on both sugar pine and ribes growing along the Sawyers Bar-Cecilville Road in the southeastern part of the forest. One diseased pine with cankers of 1937 origin was located in Callahan Gulch. Infected bushes of R. sanguineum were found in Callahan Gulch and at two places in the headwaters of Crawford Creek. These infection centers further illustrate the high susceptibility of R. sanguineum. At every location examined where this species occurs in numbers, the leaves of one or more bushes were found to be infected.

In addition to those areas described, cankers on sugar pine were found along Cow Creek, the Middle Creek road, the Lumgreys Creek road, Empire Creek, Grouse Creek, Shaft Rock Trail, and at China Peak Lookout. Infection was found on ribes along Bear Creek, Red Mountain Road, Red Mountain Creek, Poker Flat Road, Grider Ridge Road, Dutch Creek, and on Sterling Mountain. Infected R. bracteosum was found at the mouths of Tea Creek and the East Fork of Indian Creek.

During the 1944 scouting season 182,575 cankers were removed from 8,671 diseased trees. There were 17,176 pines examined on this forest.

Scouting on the Trinity National Forest

Sugar pine and ribes on the northeast slope of that part of South Fork Mountain extending north of Forest Glen were examined. Blister rust on ribes was fairly common at those sites where conditions were favorable to the incidence and development of the disease. Most of these places were found at meadows and at those spots where roads crossed streams. At these latter sites, the openings in the timber canopy caused by the construction of the road made it possible for aeciospores to reach the leaves of the ribes located there whereas no spores reached the bushes growing under the stand of timber above and below the road.

The infected bushes were scattered showing no center of concentration and the intensification of the rust on the infected bushes was light. The pattern of diseased bushes gave no indication of nearby cankers, but on the contrary, the bushes had all the appearances of having been infected by spores produced at some distant infection center.

The infected ribes at the upper portion of the Sheep Camp center and those at Cold Springs Lookout were growing at an elevation of 5,200 to 5,500 feet. This elevation was above the altitudinal range of sugar pine for this particular locality.

Bushes of Ribes bracteosum and R. sanguineum were found infected at Klondike Mine, by the roadside at Swift Creek, as well as at some of the other small streams in that general area. Rust was found on R. binominatum, R. lobbi, and R. bracteosum at Sheep Camp and on the stream just below Sheep Camp. Ribes viscosissimum was the only ribes species found infected at Cold Springs Lookout.

Some scouting was done in the vicinity of Minersville and the Stuart Fork of the Trinity River. No infection on either host was located in this area.

Ribes bracteosum occurs along many of the streams on the northeast slope of South Fork Mountain.

The infection centers at Sheep Camp and Cold Springs Lookout are the highest in elevation yet found on this forest. These finds add evidence to the hypothesis that conditions necessary for rust development occurred at a generally higher altitude in the sugar pine belt than they had during previous years.

Scouting on the Shasta National Forest

The infection center along Damnation and Clear Creeks on the Shasta National Forest was examined. Little intensification of the rust on sugar pine has occurred since the disease was established there in 1937. The pine on one small area near the trestle which spans Bear Camp Creek had several cankers of 1941 origin. Two bushes of R. roezli were lightly infected; however, numerous bushes of R. nevadense were quite heavily rusted. For some yet undetermined reason, the bushes of R. roezli and R. cruentum growing in this area are highly resistant to blister rust. Bushes of these two species growing only a few miles away do not have this characteristic, as they become infected with their normal ease.

Scouting in the Pondosa country revealed infected ribes along Indian Creek, Deadman Creek, Moosehead Creek, and at Bosworth Meadows. Since this infection occurred within the range of both blister rust and pinyon rust, samples were collected and submitted for determination. The results of these determinations show that some of the diseased bushes at all of the areas except Bosworth Meadows were infected with blister rust.

A few ribes and sugar pines in the vicinity of Buck Butte were examined for blister rust. The timber was cut from this area a few years ago and the disturbance caused by logging resulted in some ribes regeneration at spots favorable to ribes growth. Ribes are generally few in this part of the forest. Most of the bushes found and examined were R. cruentum. No rust was found on either host.

Scouting on the Modoc National Forest

During the first part of September, an examination was made of the white pines and ribes on both the eastern and western divisions of the Modoc National Forest. The western portion generally afforded poor scouting conditions because of the scarcity of ribes and the dryness of the site.

The ribes and white pines in the Lost Lake area in the southern Warner Mountains are growing under conditions ideal for rust incidence and development. At the present time, however, the elevation may be a little high for infection. Numerous bushes and clumps of both Ribes petiolare and R. inerme occur along Silver Creek both above and below Lost Lake. Bushes of R. petiolare growing in association with both white bark pine and western white pine were found on the east fork of the stream about one-fourth mile above the lake. This area should be inspected annually. Several bushes of R. inerme growing along Mosquito Creek were scrutinized. There are no pine trees along this drainage.

No infection was found on either ribes or pines on this forest.

Scouting on the Lassen Volcanic National Park

The Kings Creek infection center on the Lassen Volcanic National Park was inspected. About 35 per cent of the bushes of R. roezli examined were infected with some species of Cronartium. The diseased bushes were scattered along the stream for a mile or more but there was no concentration at any spot. While the pattern of diseased bushes indicates that the ribes-infecting spores were blown in from some outside source, the large number of diseased bushes present also suggests that infected pines may be present along the stream. Since this area is in the zone where the range of blister rust and pinyon rust overlap, specimens of the Cronartium were sent to the laboratory for identification. Three of the eleven samples were identified as blister rust. A thorough search for cankers on the western white and sugar pine trees growing along Kings Creek should be made during the 1945 field season.

Many R. montigenum growing on the flats along Hat Creek were examined, but no infection was found.

Scouting on the Lassen National Forest

Scouting both by organized crews and by members of the ribes eradication camps was confined to the better rust sites.

Every pine infection center examined, five of 1944 discovery, was of 1938 origin, yet only four of these centers showed any intensification of the rust on sugar pine since the disease had become established. Since infected ribes have been found at some of these centers for the last four seasons, the small amount of intensification on sugar pine indicates that all factors necessary for rust development have never been present at the same time at many of these areas.

Five more infection centers involving sugar pine were located during 1944. One was on Buffom Creek which is about one and one-half miles northwest of the Buckhorn Lodge infection center. The extent of the infection along this stream was limited to seven diseased trees with eight cankers. Another center having four trees with one canker each was located on the banks of Hall Creek. This area is about 30 chains north of the one on Buffom Creek. Although the rust had been present at both centers since 1938 and some of the cankers had been sporulating since either 1941 or 1942, no incipient cankers were found.

Scouting at Kenyon Lake revealed one canker on a sugar pine tree. Infected ribes bushes were found around the lake in 1943. The canker was of 1938 origin and from all appearances had sporulated for the first time in either 1941 or 1942, yet no incipient cankers were found. The infection center located beside Battle Creek at a point about two miles northeast of Mineral was similar in every respect to the one at Kenyon Lake.

The one center found in 1944 at which intensification of the rust on sugar pine had occurred since its establishment in 1938 was located at a small meadow about one mile south of Lynch Meadows. Although about half the cankers were of 1941 or 1942 origin the extent of the disease here was confined to ten trees bearing 22 cankers. There were hundreds of Ribes roezli and numerous young sugar pine trees growing around the edges of the swamp-like meadow yet only a small number of additional cankers had developed on the pines.

The three pine centers having incipient cankers in 1943 were examined again. A few more cankers of both 1938 and 1941 origin were found at the Buckhorn Lodge area. This was also true of the center beside Little Hatchet Creek. However, no infection on sugar pine was found at the Hatchet Creek Bridge center although seven trees supporting 337 cankers had been removed in 1943.

A few cankers were removed from each of the following pine infection centers; Goat Creek, Goat Meadows, South Fork of Montgomery Creek, Bailey Creek, Hatchet Creek, and Indian Springs. No additional cankers were found at the Clear Creek, North Valley and Rag Dump pine infection centers. The rust has failed to intensify at these latter nine centers for one reason or another. The cankers at some areas were removed before any spores had been produced. At other areas, the ribes had been eradicated before intensification of the rust on sugar pine had occurred; yet, the reason for the lack of intensification of the disease on pines is unknown at some of the areas where sporulating cankers and ribes have been present for the past four seasons.

In addition to centers already described, infection was found on ribes along Haynes Creek, Cow Creek, Cedar and Willow Creeks, South Branch of Mill Creek, Deer Creek, Mill Creek, Cement Creek, Butt Creek, Yellow Creek, Willow Creek, Old Cow Creek, Rock Creek, Dogwood Creek, Camp Creek, and Lockerman Creek and at Hatchet Mountain, Silver Lake, Miller Mountain, Jennie Springs, Lake Almanor, McGowan Lake, Soda Springs, North Valley, and Flea Valley.

Infection on ribes was common throughout the forest at those spots where numerous ribes were growing in openings. Since the range of the two rusts overlap on this forest, it was necessary to collect numerous specimens of the Cronartium found at the various sites to determine whether or not only one or both species were present and to what extent. More than 170 samples were submitted; and, so far, the results of the determinations indicate that about 65 per cent were blister rust. Of the 7,770 sugar pine trees examined 64 had 94 blister rust cankers. All cankers were removed.

Scouting on the Plumas National Forest

The Lost Creek drainage, where cankers have been found on sugar pine since 1941, was thoroughly covered. Four infected trees were found along the

stream at two new locations, one about a half-mile and the other about a mile above the Lost Creek Reservoir. The rust had made its entry in 1938 and one tree showed a rather heavy increase in number of cankers in 1941. Ribes eradication crews during the past two seasons have removed most of the bushes adjacent to Lost Creek.

One infected sugar pine with two cankers was located at Strawberry Valley. The disease had made its incidence during 1938 and no evidence was found that any intensification on pine had occurred since that year although one canker had sporulated several times. The infected pine is about two miles farther south than the Sly Creek center which was the southernmost known one until this discovery was made.

The largest infection center involving sugar pine that has yet been found on the Plumas National Forest was discovered at King Ranch Meadow. This meadow lies just under the crest on the east side of Oak Flat Ridge between Brushy and Rock Creeks and is in the general vicinity of the other infection areas on the southern end of the forest. The rust became established on sugar pine during 1938 and the first crop of new cankers was started in 1941. When this center was located in 1944, there were 169 cankers on 64 trees. There were hundreds of ribes bushes and young sugar pine trees growing around the edge of the meadow particularly at the southeast side. From all appearances, this should have been a site highly favorable to the spread and development of the rust on pines. This observation was not borne out as only 169 cankers were found and about 15 per cent of these were of 1938 origin.

Scouting records show that aeciospores during the spring of 1938 were disseminated southward rather generally over the sugar pine stands of the Sierra Nevadas. Although, infection occurred only at those areas where conditions were extremely favorable to rust development. There were few or no summer rains, hence the rust failed to intensify on ribes leaves to any marked extent except at two spots on the northern end of the Lassen National Forest. The ribes have been infected more heavily each season since the spring of 1941 than they were during 1938, yet little intensification has occurred on sugar pine. This lack of rust build-up on pines indicates that conditions necessary for rust development on sugar pine were more favorable in 1938 than they were during the seasons of 1941 to 1943 even though ribes infection was much heavier during the latter years.

The action of the rust on the Shasta, Lassen, and Plumas National Forests leads to the belief that the rust, under conditions prevailing in the Sierras, will not intensify and develop as rapidly as it has on the Klamath National Forest.

Cronartium infection on ribes was rather general throughout the Forest but the ranges of the two rusts overlap here; so it was necessary to collect specimens for identification. Of the 137 samples submitted, about 48 per cent proved to be blister rust.

In addition to the areas already described, rusted ribes were found along Yellow Creek, Squirrel Creek, Taylor Creek, Greenhorn Creek, Little Long Valley Creek, Estray Creek, Bull Run Creek, Poplar Creek, Peoria Creek, Wallace Creek, Big Gulch, Pats Ravine, Rabbit Creek, Clarks Ravine, Camp Ground Creek, Canyon Creek, French Creek, Rock Creek, Scales Ditch,

Gold Run Creek, Pinchard Creek, Knownothing Creek, Slate Creek, and Deadwood Creek as well as at Butt Lake, Spring Garden, Bucks Lake, Oroleve, American House, Strawberry Valley, Hansen Orchard, Deadwood Creek Ranch, Poverty Hill Mine, and Scales. Ribes at numerous other spots were examined but no rust was found.

The pattern made by the infected ribes bushes scattered over the forest strengthens the belief that there was a general distribution of aecio-spores from northern sources during the spring of 1944.

Scouting on the Tahoe National Forest

Scouting on the Tahoe National Forest revealed that there had been a general spread of both of the species of Cronartium as specimens of this genus were located on ribes at 54 of the 61 areas visited. The telia on many of the specimens had partially or wholly germinated at the time of collection and, as a result, identification as to which rust was involved was not always possible. There were 311 samples taken of which 129 or 41 per cent gave a blister rust reaction when the determinations were made. The 129 specimens of blister rust came from 41 different areas.

Ribes roezli appeared to be about four times as susceptible as R. nevadense as 10 per cent of the 2,727 bushes of the former species were found to be infected while only 2½ per cent of the 562 bushes of the latter species were rusted.

Scouting on the Eldorado National Forest

Rusted ribes leaves were found at nearly every spot on the northern end of the Eldorado National Forest where ribes were examined. Infection on ribes was the heaviest ever observed on this forest; in fact, it was the heaviest ever found where sporulating cankers were not abundant. From 30 to 50 per cent of the bushes growing in and around the meadow adjacent to Pilot and Plum Creeks were infected with a Cronartium. Scouting along the road leading into Robbs Valley and at the valley itself revealed that an even higher percentage of the bushes were infected.

Although pinyon rust was widespread in the Sierras during 1944 it appeared to have reached its peak of intensification on ribes growing between 5,000 and 6,500 feet on the northern end of the Eldorado National Forest. As in the forests to the north, the rust was scattered generally over the forest. The finding of rusted bushes at an elevation of 7,000 feet was not uncommon. Most of the specimens identified as blister rust were collected at elevations above 5,500 feet indicating that moisture and temperature conditions favorable to rust development on ribes existed at higher altitudes this season than heretofore.

After the first definite identification of blister rust was received, an intensive search was made at a great many areas scattered throughout the forest in an effort to determine the southern boundary of the zone of spread. Over six hundred specimens of Cronartium on ribes were collected; and of this number, tests have been made on 425 samples. The result of these tests showed 57 samples or 13 per cent to have a blister rust reaction.

There are 182 samples yet to be identified. The southernmost sample identified as blister rust was collected from a ribes alongside the road in section 27, T. 8 N., R. 15 E. This find placed the disease on ribes 65 miles farther south than it has heretofore been found. Blister rust was found on ribes at 23 different areas on this forest.

Bushes of Ribes amarum growing near Zero Springs beside the Rubicon River Road were found infected with Cronartium occidentale. This is the first time a Cronartium has been noted on R. amarum growing in its native habitat.

Rusted ribes were found at each of the 78 areas examined on the Eldorado National Forest. Over 23 per cent of the 3,668 bushes of R. roezli examined were infected with a Cronartium while nearly 12 per cent of the 258 R. nevadense were diseased.

Scouting on the Stanislaus National Forest

Rusted bushes on the Stanislaus National Forest were observed during the early part of August. All these early collections proved to be pinyon rust. After blister rust was found on the Eldorado National Forest, more intensive scouting was begun on ribes at likely spots on the northern end of this forest. A total of 204 Cronartium samples were taken during the second week of October. Fall rains had already started telia germination making determination difficult on even the best preserved specimens while many rust specimens were beyond identification.

Scouting revealed that the rust reached its heaviest intensification on ribes at altitudes ranging between 5,800 to 7,000 feet. No infected bushes were found below the 4,600 foot level although the bushes at many areas below this elevation were examined. Rusted bushes growing along the Ebbets Pass Highway were found at an elevation of 8,000 feet.

One bush of R. cereum was found infected with Cronartium occidentale in section 21, T. 8 N., R. 19 E.

Since the telia on the samples of rust collected in October were germinating, it was practically impossible to make positive identifications, but two specimens found in section 16, T. 8 N., R. 19 E. showed every indication of being blister rust. Twenty of the other samples showed slight blister rust reactions so it is possible that the disease is now on this forest. Even though the two specimens found in section 16 are blister rust, the southward spread will not be increased beyond that already recorded on the southern end of the Eldorado National Forest. Most of the samples showing a possible blister rust reaction were collected at areas lying above the sugar pine belt. Of the 1,165 ribes examined over 18 per cent were infected with a Cronartium. Only three bushes of R. nevadense were diseased.

A species of Cronartium was found on ribes at Ham Luddy Meadows, Cuneo Meadows, Baileys, the bridge over the Middle Fork of the Mokelumne River, Camp Connell, Walkers Meadow, Barnetts, Clark Mine, Shufly, Smooth Wire, Junction of Hells Half Acre Road and Longbarn as well as along Forest Creek, Upper Beaver Creek, Cow Creek, Cascade Creek, Smooth Wire Creek, and Ebbets Pass Highway from Big Meadow to Hermit Valley.

Scouting Elsewhere

Two ribes infected with pinyon rust were found in the Yosemite National Park. One diseased bush having pinyon rust was located near Soquel on the Sierra National Forest. Some ribes were examined in both the Sequoia and Kings Canyon National Parks but none were infected.

Two infection centers in Marin County involving ribes were located in 1943. The rust appeared to have wintered on these bushes as it was well developed in April when discovered. On the last day of March 1944, an inspection was made at these centers to determine whether or not the rust had overwintered again. Since the winter had been rather severe for the San Francisco Bay area, no old leaves were left on either Ribes divaricatum or R. glutinosum and only a few bushes of R. menziesi retained any of the 1943 leaves. Close scouting revealed that no leaves had survived the winter on the one bush of R. menziesi which had harbored the rust the previous year.

It appears from these observations that even though the rust may sometimes winter on the leaves of ribes growing along the coast in northern California, it will not always be able to do so. Unlike the weather of southern California where pinyon rust is continuously present on ribes, the country north of San Francisco Bay is occasionally subjected to frosts, of sufficient severity to stop plant growth for a short time. All ribes leaves may drop during these cold periods, thus leaving the bushes free of rust until reinfected by aeciospores.

SUMMARY

Scouting during 1944 revealed several new blister rust infection centers. Also, additional observations were made on the rust's behavior. A resume of the results of the scouting season follows:

1. There was a general long-distance spread of the rust southward in California from aeciospores produced at northern sources. This spread is known to have reached the southern end of the Eldorado National Forest and there is some evidence that it has reached the Stanislaus National Forest.
2. Moisture and temperature conditions conducive to aeciospore germination on ribes were particularly favorable during the spring of 1944. Climatic conditions favorable to the intensification of the disease on ribes also occurred from one to several times during the summer.
3. The season was unusually favorable for the spread and development of pinyon rust on the Plumas, Tahoe, Eldorado, and Stanislaus National Forests. This rust reached its peak of development on the Eldorado National Forest where over 20 per cent of the ribes were infected.
4. The ribes infection centers in Marin County of California where blister rust had wintered, were examined during March of 1944. The severe winter had caused the ribes bushes to lose all their leaves. As a result, there was no wintering of the rust in 1943-1944 at that location.

5. The blister rust infection zone in the Sierra Nevadas was extended southward 65 miles when the fungus was found on ribes south of the highway in Amador County.
6. Blister rust was found for the first time on the Eldorado National Forest. Diseased bushes were found scattered across the forest from Big Meadows on the north to section 27, T. 8 N., R. 15 E. on the south.
7. There is a possibility that blister rust reached the northern end of the Stanislaus National Forest during 1944.
8. There is evidence that bushes of Ribes cereum on the Umpqua National Forest had been the source of sporidia causing slight damage to nearby western white pines.
9. Pinyon rust was found for the first time on R. amarum growing in its native habitat. The infection of these bushes occurred on the Eldorado National Forest.
10. Conditions favorable to rust development occurred generally at higher elevations during 1944 than has been noted heretofore.
11. Pinyon rust was found on ribes growing at an elevation of 8,000 feet.
12. Nearly all blister rust cankers observed were removed. During the summer, a total of 213,986 cankers were removed from 10,449 western white and sugar pines.

TABLE 2

SCOUTING RESULTS FOR THE PACIFIC COAST REGION-1944

National Forest or Area	Ribes		Sugar and Western White Pines				
	Examined	Infected	Examined	Infected	Cankers		
					Stem	Limb	Total
Oregon							
Umpqua	238	77	235	37	24	160	184
Crater Lake Nat'l Park	620	2	235				
Rogue River	1,504	262	3,135	981	589	15,498	16,087
Siskiyou	1,579	260	4,553	597	392	14,249	14,641
Oregon Caves Nat'l Monument	40	25	25	4	2	8	10
Total for Oregon	3,981	626	8,183	1,619	1,007	29,915	30,922
California							
Klamath	2,598	577	17,176	8,671	6,009	176,566	182,575
Trinity	560	27	38				
Coastal Areas	105						
Shasta	590	56	360	26	5	101	106
Modoc	270		120				
Lassen Volcanic Nat'l Park	521	156	36				
Lassen	38,444	1,074	7,770	64	12	82	94
Plumas	12,213	1,041	6,852	69	6	283	289
Tahoe	3,328	308	633				
Eldorado	3,826	840	276				
Stanislaus	1,165	205	113				
Sierra	300	1					
Yosemite Nat'l Park	300	2					
Total for California	64,220	4,287	33,374	8,830	6,032	177,032	183,064
Total Pacific Coast Region	68,201	4,913	41,557	10,449	7,039	206,947	213,986

PART VIII

BLISTER RUST CONTROL RECONNAISSANCE

By

Lyle N. Anderson, Agent, P-2

INTRODUCTION

An inspection of the available information pertaining to blister rust control revealed that proper planning of the ribes eradication program for some units or parts of units is handicapped by a lack of reconnaissance data. Little knowledge is available on the amount of sugar pine, ribes distribution, and working conditions on some of the forests. This information is needed to determine whether control units as now outlined meet the minimum stocking requirements and whether additional areas warrant inclusion.

The Forest Service, the Oregon and California Revested Lands Administration, and the Bureau of Entomology and Plant Quarantine saw the need of securing additional information on the Siskiyou National Forest in Oregon before planning more initial eradication work. In recognition of this need, the three interested agencies assigned two mappers each to a reconnaissance project on this forest. The Forest Service also provided the chief of party and a cook, serviced the camp, and furnished a truck. On September 4 the reconnaissance party was organized from the recently closed eradication camps. The assistant technical supervisor for the Oregon operation, L. N. Anderson, assisted in the training of the party, the planning and inspecting of the work, the laying out of the areas to be sampled, the summarizing of the results, and the preparation of the final maps.

In addition to the Oregon reconnaissance, some pine counting was done by the Forest Service on the Plumas National Forest in California.

LOCATION AND DESCRIPTION OF AREAS

The Siskiyou crew, working out of the Oregon Caves camp, started work on the east side of the Bolan Lake control unit adjacent to where ribes were eradicated in 1944. This area lies along the Caves Highway east of Sucker Creek and includes the Oregon Caves National Monument and Horse Mountain. The elevation varies from 2,000 feet at the mouth of Caves Creek to 5,200 feet at the top of Horse Mountain. At the lower elevation the area is extremely brushy and steep with but few scattered ribes. The better sugar pine is found at the lower elevations where it is all-aged and grows in association with Douglas fir. In the vicinity of the Caves the sugar pine type is very patchy and Ribes sanguineum, R. lobbi, R. cruentum, and R. lacustre are numerous.

The reconnaissance party was moved to Trapper Cabin in the Mt. Reuben unit on September 19. Work was terminated October 12 because of fall rains. The unit is traversed by the forest roads from Glendale on the Pacific Highway and Galice on the Rogue River west to Marial and the Eden Guard Station. This area is a high plateau that descends gently on the south

to the Rogue River but breaks off sharply into tributaries of the Umpqua River on the north. A heavy understory of tanbark oak, manzanita, rhododendron, and chinquapin covers a large part of the area. There is a fine stand of all-aged sugar pine growing in association with Douglas fir covering all the area sampled and mapped. The site qualities are as good as any observed in the control units of the Siskiyou National Forest. Ribes are few and most of them are confined to either rocky outcrops or areas adjacent to the streams. Ribes bracteosum bushes growing along Kelsey and Bobb Creeks probably account for the large amount of nearby rust damage. Other species of ribes found scattered over the area are R. glutinosum, R. cruentum, and R. lobbi. The cutting of several access manways to decrease the amount of walking time of checkers and eradicators would be helpful in working country so brushy and remote.

In California pine count on 2,600 acres lying along Mooreville Ridge of the Plumas National Forest was taken to determine whether sufficient sugar pine reproduction had appeared to warrant including parts of this 1931 burn in the control unit. Numerous ribes have established themselves since the fire.

METHODS OF WORK

The methods used in the reconnaissance work in Oregon were similar to those employed in the past. Four strips were run per section by compass and pacing. Ribes data were taken on a continuous strip as in checking work, and recorded by five-chain transects. Sugar pine data were taken on one-tenth-acre circular plots at ten-chain intervals along the course of the strip. A type map and a brush density map were also prepared. The timber was typed as sugar pine mature, non-sugar pine mature, sugar pine cut-over, and non-sugar pine cut-over. Sugar pine data were recorded by the following four size classes: (A) trees less than six feet high, (B) trees six feet high to 3.5 inches DBH, (C) trees 3.6 inches DBH to 11.5 inches DBH, (D) and trees 11.6 inches DBH and over. Typing was based on actual tree counts made on the plots. Seven combinations of size classes which constituted sugar pine type for a tenth-acre plot are as follows:

Minimum Number of Trees by Size Class
Constituting Sugar Pine Type

Combinations	Size Classes			
	A	B	C	D
	0-6'	6'-3.5"	3.6"-11.5"	11.6" +
1	15	-	-	-
2	12	1	-	-
3	8	2	-	-
4	4	3	-	-
5	-	4	-	-
6	-	-	1	-
7	-	-	-	1

As an example: if a tenth-acre plot supported 10 trees of size class A, 3 trees of size class B, and 2 trees of size class D, then it can be seen from the above table that the requirements are more than met in class D and also in the combination of the other two size classes.

Sugar pine counts on the Plumas National Forest were taken on from four to eight strips per section continuously throughout the length of each strip. The size classes were the same as those described for reconnaissance and the method of taking ribes data was the same.

WORK PERFORMED AND RESULTS OBTAINED

Blister rust control reconnaissance data were taken on 4,718 acres of the Bolan Lake unit of the Siskiyou National Forest. Of this area, 1,922 acres averaging 24 sugar pines per acre was classed as sugar pine type. The entire upland covered by the reconnaissance averaged 19 ribes per acre. The presence of several ribes concentrations adjacent to and within the Oregon Caves National Monument greatly influenced the average ribes figure. On the Mt. Reuben area data were taken on 4,767 acres of which 3,190 acres was classed as sugar pine type with 61 sugar pines per acre. This area averaged only 2.2 ribes per acre in the upland but has several concentrations of Ribes bracteosum along the streams.

Sugar pine counts were taken on 2,600 acres of the Mooreville Ridge unit of the Plumas National Forest. Results show that a part of the burn now has sufficient sugar pine reproduction to warrant inclusion in the control unit. The burn averages 57 sugar pine trees per acre with a good proportion of all four size classes represented.

Table 1 shows the sections and acreages that were covered by the reconnaissance party on the Siskiyou National Forest.

Table 2 is a summary of the data for the Siskiyou National Forest compiled on the basis of the four recognized size classes.

TABLE 1

LOCATION OF AREAS COVERED BY RECONNAISSANCE ON THE SISKIYOU NATIONAL FOREST 1944

Control Unit	Township	Range	Sections by Numbers	Totals	
				Sections	Acres
Bolan Lake	40 S	6 W	4, 5, 6, 8, 9, 16, 17	7	4,718
Mt. Reuben	32 S	8 W	30, 31	2	1,280
	32 S	9 W	4, 5, 6, 8, 9, 16, 17	6	3,487
	Subtotal			8	4,767
TOTAL				15	9,485

TABLE 2

SUMMARY OF RECONNAISSANCE DATA FROM THE
SISKIYOU NATIONAL FOREST, OREGON

1944

Timber Type (Sugar Pine Mature)	Acres	PER ACRE					Upland Ribes
		Sugar Pine by Size Classes					
		0-6'	6'-3.5"	3.6"-11.5"	11.6"+	Total	
Bolan Lake	1,922	14	4	2	4	24	19
Mt. Reuben	3,190	42	11	3	5	61	22

ANNUAL REPORT - 1944

RIBES ECOLOGY AND DEVELOPMENTAL WORK

IN METHODS OF RIBES ERADICATION

BY THE

BERKELEY OFFICE

Work Project BLR-1-6

PART IX

RISES ECOLOGY AND DEVELOPMENTAL WORK IN METHODS OF RISES ERADICATION IN THE PACIFIC COAST REGION, 1944

By

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FOREWORD

Methods development and ecology work in the Pacific Coast Region for 1944 included checking and maintenance of previously established ecology and chemical plots, collaboration with operation supervisors in evaluating the ribes regeneration problem, tests of ammonium sulfamate alone or in mixture with other chemicals on Ribes bracteosum, R. cereum, R. inerme, and R. roezli, collection of soil and duff samples for ribes seed extraction, and additional chemical tests on the identification of the limits of blister rust infection in sugar pine bark. In the tests of new herbicides, plot work was facilitated by the help of Ross Ellis, Benton Howard, Reed Miller, and John Mitchell. The checking of the ribes-in-brush plots on the Eldorado National Forest was expedited by the help of Robert Sovulewski. With Frank Patty, an inspection was made of the work of a tractor crew in the Crane Flat area of Yosemite National Park. Pictures were taken of the rear end hook in operation and of the highly effective work of this special eradication crew.

Because of the wartime shortage of experienced field supervisors for regular control work and the inadvisability of making large-scale methods tests with the labor now available, full time services of L. P. Winslow were again used in operations work on the Klamath, Siskiyou, and Rogue River National Forests.

The following are some highlights from the 1944 ecology studies: On a number of plots more current season ribes seedlings appeared in 1944 than in 1943. This increase was of small magnitude, and is considered to be a variation in the declining curve of ribes seedling occurrence. From exclosure plot data the tentative conclusion may be reached that strict exclusion of grazing animals appreciably lowers ribes seedling occurrence, but favors rapid growth and early fruiting of established bushes. Data from one-acre regeneration plots point out that a significant percentage of missed ribes in the small bush classes are ecologically stunted and not just young plants. The same plants have been missed in repeated eradications. Correlative studies on methods of eradication, ecology, and pathology are needed to determine the amount of protection work that would be economically justified in this small-bush population. On two of the ribes-in-brush plots on Hogan Mountain, Sierra National Forest, a combination of disturbance factors caused a shift from a rather mature plant association in which ribes seedlings had little chance of surviving to one favorable to vigorous ribes regeneration.

Previous annual reports, especially the 1942 report, have presented status summaries of the major ribes ecology sub-projects. Serial Report No. 112 of the Berkeley Laboratory (October 8, 1941) described methods of collecting ecology data, and listed studies and plots making up the ecology program. The 1940 annual report cited all material pertaining to specific plots or sub-projects which had appeared in the annual reports prior to 1940. Reference to each ribes ecology plot or sub-project in the annual reports of 1941 to 1944 inclusive has been restricted to the pertinent data in the previous annual report.

SECTION I. RIBES ECOLOGY IN THE SUGAR PINE TYPE

1. The Cow Creek 10-Acre Regeneration Plot.

See the 1943 annual report, pp. 91, 95.

Both sets of 10 selected square-chain subplots (eradicated and uneradicated) of the Cow Creek 10-acre plot (CFES, MC#5) were inspected again in 1944.

Eradicated Subplots. In 1942, the first year after ribes had been removed from these 10 subplots, 10 small ribes "misses" were found and removed. These 10 bushes varied from a few inches of live stem to 3 feet, and averaged 1.3 feet of live stem. Years-of-origin varied from 1934 to 1941. About 50 CSS (current season seedlings) were found in 1942 and left on the subplots.

In 1943, 12 small ribes older than CSS were found and left on the 10 subplots, but only one plant (one with 25 inches of live stem) had more than 3 inches of live stem. Only 5 CSS were found in 1943.

In 1944, 17 ribes older than CSS were found, but they averaged only 3 to 4 inches of live stem. About 75 CSS were observed this year.

The brush on this area is apparently not thick enough to completely exclude "new" ribes, but is thick enough to cause a very low ribes vigor, and a very slow growth rate.

Uneradicated Subplots. Table 1 reports a summary of the data collected from these 10 uneradicated (control) subplots during the past 4 years. This ribes population is practically static both as to number of plants and as to total live stem. Future records from these plots will facilitate the task of correlating variations of ribes live stem, fruiting, and estimated vegetative vigor with climatological and other ecological factors.

2. Occurrence of Current Season Seedlings.

See the 1943 annual report, pp. 91, 96.

Table 2 records the numbers of current season seedlings found on this series of small plots in 1944, and in 1943 for comparison.

In the spring of 1944 more Ribes roezli seedlings appeared than in the spring of 1943. See annual report 1943, p. 96. The 1944 data are considerably more erratic among the several plots than the 1943 data. Two of the plots (plots E and F) that show a large 1944 increase of seedling occurrence were very much trampled by cattle in 1943. The great disturbance to surface soil of these plots may well have caused the relatively large increase of 1944 current season seedlings. Data from several of these plots will be subjected to statistical analysis in an attempt to isolate the causes of the unexplained variations which have occurred.

3. Seedling Survival and Growth on Worked Areas.

See the 1943 annual report, pp. 91, 96.

Table 3 summarizes the data collected from this series of plots in 1944.

In general, seedling survival was appreciably higher for 1943-44 than for 1942-43. On the average, a few more current season seedlings appeared on these plots in 1944 than in 1943. The rather wide variations of seedling occurrence and seedling survival within small areas is again apparent in the data from these plots.

4. Occurrence and Growth of Ribes on Burns.

See the 1943 annual report, pp. 92, 97, 98.

Table 4 presents a summary of the data collected to date from the burned portion of the 5.6-acre Cow Creek plot (CFES, MC#12). In the early years of the study, ribes seedlings on this burn were staked for annual measurement as soon as they appeared to have become established. The progressively increasing size of the surviving individuals of a group of seedling-origin plants is shown in the horizontal lines of data. The generally decreasing size of bushes of the same year of origin with year of staking is shown from top to bottom in the vertical columns.

The average growth of ribes on this plot has been relatively slow, and the variation in size of ribes of the same year-of-origin is great. For example, three 1937-origin ribes exceeded 40 feet of live stem in 1944, while 20 plants of the same year of origin had less than 5 inches of live stem. In this instance "average" seems to have little significance.

Table 5 presents the size and year-of-origin distributions of all surviving staked ribes on the burned portion of the 5.6-acre Cow Creek plot (area about 1.5 acres), and on the Cow Creek 1937 spot burn plot (area about 1.5 square chains). Prior to 1942 there were small unstaked ribes of low vigor on the 5.6-acre plot burn, in addition to the staked bushes reported in the table. Beginning with 1942, all known ribes one year old or older have been staked at time of inspection. The decrease of total known bushes in 1944 over 1943 suggests that the number of established bushes on this area is near the maximum. Total live stem is still rapidly increasing.

The differences in ribes populations between these two burn plots are interesting. The larger and hotter burn on the 5.6-acre plot probably explains the greater regeneration of the ribes population. But even on this plot, the number of ribes 5 years old or older with less than one foot of live stem is worthy of note. Also noteworthy is that in 1944 more than half of the 411 staked bushes of all years of origin on this burn have less than 3 feet of live stem. Unsummarized observations on this plot indicate that vigor and rate of growth of Ribes roezli is directly correlated with intensity of burn.

Data for fruiting bushes on the 5.6-acre burn plot are presented in section 7 of this report.

Inspection of the Cutler Meadow burn plots in 1944 indicates that after a fire seedling regeneration of sundry brush species, especially of deerbrush and snowbrush, as well as of R. roezli, is of the "one-crop" order. The milacres denuded of brush seedlings in 1942, except for species resprouting from roots or underground stems, are still bare. Practically no ribes seedlings have appeared on these plots since 1940, the first year following the burn.

5. Regeneration of Ribes on One-Acre Plots.

See the 1943 annual report, pp. 92, 97, 98.

Table 6 presents ribes data collected in 1944 from this series of plots.

The 1944 fall inspection of the Signal Peak one-acre plot shows the fewest ribes and the least live stem ever recorded from this plot. However, the age distribution, as reported in table 7, suggests that the same ribes have been missed by successive eradications. A detailed study of the plant associates and conditions surrounding the repeatedly missed bushes is contemplated.

The ribes population on the Shaver Timber plot is growing with exceptional vigor. Unless eradication, late frost, or some biotic agent intervenes a large number of Ribes roezli bushes will fruit on this plot in 1945.

All known ribes on the Blue Canyon plot were removed on August 4, 1944. Because of the advanced stage of conifer reproduction on this plot, and because of the very thorough "working" it is expected that very few ribes will be found on this plot in subsequent years.

The Gentle Gully plot (Big Bar Mt.) continues to be, as far as ribes are concerned, the most vigorously regenerating one-acre plot on the Plumas N. F.

The Fanianni Area plot, in spite of a recent logging, is regenerating ribes very slowly.

6. Conditions on Grazing Exclosure Plots.

See the 1943 annual report, pp. 93, 99-102.

Table 8 presents data on the occurrence of CSS on the 2 exclosure plots in the southern part of the Sierra Nevada. On both plots, notice that there were more CSS in 1944 than in 1943. This indicates that the spring of 1944 was climatologically more favorable for CSS occurrence than the spring of 1943. In the percentage columns to the right of the table notice that the greater percentages of seedlings occur outside the fence. This trend is very marked on the Chowchilla Mt. plot. No great difference in CSS occurrence appears between hand- and oil-eradication.

Tables 9 and 10 present rate-of-growth data for the ribes which have appeared on the Cow Creek and the Chowchilla Mt. exclosure plots since initiation of the study in 1940. The ribes originating in 1941 and in 1942 inside the fences have a greater average size than the ribes outside. On the other hand, the ribes originating in 1943 and in 1944 tend to be larger outside the fences. Indications are that bushes inside the fence will fruit first, and most abundantly

Thus for a few years the strict exclusion of grazing appears to reduce the occurrence of R. roezli CSS, but to favor rapid growth and early fruiting of established bushes.

Planting of Sugar Pine Seedlings. See the 1943 annual report, pp. 89, 90. In the spring of 1943, 18 SP current season seedlings in 2x2x4" "Expan" planting pots were planted within the Cow Creek exclosure and 18 more within the Chowchilla Mt. exclosure. All of these seedlings were shaded by board stakes, all were irrigated upon two occasions during the summer of 1943, and all survived the summer.

In the spring of 1944 only 10 of the original 18 seedlings within the Cow Creek exclosure could be found, but these 10 were in good to excellent condition. Two were just north of small down logs, and were left without additional protection. Three were protected by placing a small tin can, open at both ends, around the seedling in such a way as to shade part of the seedling, and especially to shade the spot where the hypocotyl entered the soil. These small cans (baby-food cans) have a diameter of about 2 inches, and a height of about 2 3/4 inches. Four more seedlings were protected by shading them with a square U-shaped trough made from 2 pieces of lath 6 inches long, and one piece 12 inches long. The two shorter pieces were nailed to the edges of the 12-inch piece at one end. That part of the 12-inch piece extending beyond the 6-inch pieces was sharpened to act as a stake. The trough shade was set to the south of and sort of around the seedling. During the hotter parts of the day such a lath trough shades most or all of a small seedling and also shades the soil surface in the vicinity of the spot where the hypocotyl enters the soil. The seedling thus receives north light all day and considerable direct sunlight during the cooler parts of the day.

The first 3 horizontal lines of table 11 show the condition of these 10 seedlings surviving from the 1943 plantings.

All 18 of the SP seedlings planted in June 1943 within the Chowchilla Mt. exclosure were alive in June 1944. Twelve were protected during the summer of 1944 only by a stake made out of 1x2" board. The stake was set immediately to the south of the seedling, extended about a foot above the soil surface, was set slightly off the perpendicular to the north, and during the hottest part of the day shaded the hypocotyl, the soil around the hypocotyl, and most of the rest of the seedling as well. Six were protected by a 1x2" board stake, and also by the small tinned can described above. Data showing the survival of these SP seedlings planted in 1943 in the Chowchilla Mt. exclosure are also presented in table 11.

In the spring of 1944 more SP current season seedlings, previously grown in the greenhouse in 2x2x8" square tarred-paper open-ended Paxco propagating pots, were transplanted to the two exclosure plots. Twenty seedlings were set out in the Chowchilla exclosure on June 13, 1944. The seedlings were not disturbed at planting, that is, the paper pots were planted with the seedlings. All transplants were shaded with the square U-shaped lath trough stake described above. Fifty SP seedlings in 2x2x8" pots were set out on June 9 and 10, 1944, on the Cow Creek exclosure plots. Ten seedlings were marked only with small greenhouse pot stakes, 10 more were protected with the small open-ended tinned cans described above, 10 more with open-ended #2 $\frac{1}{2}$ tinned cans (diameter about 3 $\frac{1}{8}$ ", height about 2 $\frac{1}{2}$ "), and 10 more with the small lath trough shade described above. In addition to these 4 sets of 10 just described, which were all within the exclosure, 10 shaded with lath troughs were planted outside of the exclosure fence.

All SP seedlings transplanted to the field in 1944 were settled with water when planted, but were not thereafter irrigated.

Table 11 reports the data collected from these several series of SP seedlings during the field season of 1944.

Of the several protectors used, the small lath trough shade appears to best insure the survival and growth of transplanted current-season SP seedlings. A few additional years of observation should show whether or not the combination of current season seedlings in paper propagating pots with lath trough shades offers a plausible way to establish sugar pine in the field.

7. Fruiting of Seedling-Origin Ribes.

See the 1943 annual report, pp. 93, 94, 102.

On June 17, 1944, 164 fruiting gooseberry bushes were removed from the 24 milacres of plot G, Chowchilla Mt. An estimated total of 1,189 ft. of live stem (mean, 7.3 ft. per bush), and 3,585 green fruits (mean, 21.9 fruits per bush), were removed with the 164 bushes. The age of many of the bushes in this plot, perhaps principally because of heavy grazing and consequent unconformities in stem years-of-growth, cannot now be accurately determined. Few if any of the removed fruiting bushes were less than 5 years old; many were 8 and 9 years old.

A considerable number of gooseberry plants fruited again this year on the burned portion of the Cow Creek 5.6-acre plot (CFES, MC#12), and again as in past years, the gooseberry crop was largely or completely consumed by rodents. Table 12 presents data for the bushes fruiting in 1944. Data from previous years are summarized in table 11 (p. 102) of the 1943 annual report.

8. Square-Chain Ribes-in-Brush Plots.

See the 1940 annual report, pp. 142, 143, 146.

This series of plots had not been inspected since 1940. Table 13 reports the ribes and table 14 the pine reproduction found this year on these plots.

The sudden "blow-up" of the ribes populations on plots 5 and 6 on Hogan Mt., Sierra N.F., was a surprise, and serves to warn against undue optimism regarding the rather convenient static condition of ribes populations in dense brush fields. Two main reasons for the sudden great increase of ribes on these plots were apparent. Oyster shell scale, prevalent for a number of years in the Chowchilla Mt. and Hogan Mt. areas, had increased so much since the 1940 inspection that the brush had been killed in spots, and decidedly thinned on other portions of the plots. Deerbrush (Ceanothus integerrimus) and Ceanothus parvifolius were much more seriously or more rapidly affected by the scale than was Snowbrush (Ceanothus cordulatus). This served to markedly lower the stage of plant succession and intensity of plant competition on portions of the plots. The other factor was an appreciable but unequally distributed disturbance to surface layers of the soil by some small animal, apparently by the Mountain Beaver (Aplodontia), a nocturnal rodent. There were many small well-used trails, with a clearance of 6 to 8 inches, under the brush. Mountain beavers are discussed in: Anthony, H. E. --Field Book of North American Mammals; Hamilton, W. J. --American Mammals; and in Grinnell, Joseph, and T. I. Storer --Animal Life in the Yosemite.

The slope on which the plots are located has a N to NE exposure, and is rather moist although only one actual seepage, at the S corner of plot #5, was apparent in 1944. The seepage ran out of a hole, apparently a rodent burrow, toward which some of the trails under the brush converged. The slope is bouldery, and thus offers rather good housing facilities for rodents. The combination of factors resulted in the sudden appearance of hundreds of ribes seedlings.

The recent experience with these two brush plots supports the previously formulated tentative conclusion that the best method of controlling ribes in dense mature brush is to burn the brush when dry enough to be completely consumed, and then to start anew on forest management.

Two of the plots in the Fahey Meadows group also sprouted some R. roezli seedlings of poor vigor, but in general the occurrence of these seedlings was such as to preclude any appreciable subsequent growth. Very few ribes were found on other plots of this series.

TABLE 1

RIBES FOUND ON 10 SELECTED UNRADICATED SQUARE-CHAIN SUBPLOTS
OF COW CREEK 10-ACRE PLOT

Dates of Inspection		June 3, 1941	June 25, 1942	July 5, 1943	July 1, 1944
Size distribution of known live ribes bushes	0-1.9'	6	7	7	4
	2-5.9'	13	17	8	11
	6-15.9'	26	32	28	28
	16-40'	37	28	38	39
	41-100'	12	12	17	16
	101-500'	11	12	10	11
	501'+	1	1	1	1
Totals		106	109	109	110
Number of non-fruiting bushes		37	37	57	42
Number of fruiting bushes		69	72	52	68
Percent of fruiting bushes		65%	66%	48%	62%
Total number estimated fruits		--	8450	1530	2820
Av. number fruits per fruiting bush		--	117	29	26
Est. total feet of live stem		4682	4898	4690	5011
Variation in feet total live stem		--	+216	-208	+321
Av. feet live stem per bush		44.2	44.9	43.0	45.6
Visually estimated vigor of live ribes	E	--	5	1	3
	G	8	23	12	20
	F	37	42	56	61
	P	59	31	34	18
	VP	2	8	6	8

TABLE 2

OCCURRENCE OF RIBES SEEDLINGS ON MILACRE PLOTS, 1943-1944

Milacre Plot Series, and Location	Date of Check		No. of Mil- acres	No. of Current Season Seedlings		Ratio of 1944 to 1943- Origin Seedlings
	1943	1944		1943	1944	
1938, Chowchilla Mt., Sierra N.F.	6/13	6/14	10	309	157	0.51
1939, " "	6/13	6/14	5	165	100	0.61
Plot E, " "	6/17	6/17	12	252	561	2.23
Plot F, " "	6/17	6/17	12	81	205	2.53
Markwood Mdw., Sierra N.F.	8/10	8/3	10	3	16	5.33
Pine City Mt., " "	6/19	7/27	6	334	23	0.07
Cow Creek campsite, Stanislaus N.F.	6/11	6/21	10	229	202	0.88
Totals	--	--	65	1373	1264	--
Averages	6/28	6/29	9.3	196	181	92.3

TABLE 3

OCURRENCE OF RIBES SEEDLINGS AND ONE-YEAR SURVIVAL ON CERTAIN PLOTS,
1943-1944

Area, and Forest	Plot or Sub- plot	Date of Check		Mil- acres of Area	Current Season Seedlings Found		Ratio of 1944- to 1943- Origin Seedlings	1943- Origin Seedlings in 1944	Percent Sur- vival of 1943 Seedlings
		1943	1944		1943	1944			
Cow Creek Camp- site, Stanislaus N.F.	A	6/22	6/22	30	50	70	1.40	33	66
	B	6/23	6/21	28	232	234	1.01	86	37
	C	6/23	6/22	21	104	201	1.93	14	13
	D	6/23	6/22	4.875	0	2	< *	0	0*
Chowchilla Mt., Sierra N.F.	E	6/17	6/17	12	252	561	2.23	36	14
	F	6/17	6/17	12	81	205	2.53	25	31
Cow Creek 1.6- acre plot, Stanislaus N.F.	I	6/28	7/4	60	150	65	0.43	37	25
	II	6/28	7/4	210	270	400	1.48	116	43
	III	6/28	7/5	300	350	390	1.11	207	59
	IV	6/29	7/5	200	220	135	0.61	97	44
	V	6/29	7/5	200	110	40	0.36	28	25
	Total	6/28	7/5	970	1,100	1,030	0.94*	485	44*
Butt Creek Camp- site, Plumas N.F.	I	7/28	8/25	25	10	0	0.00	2	20
	II	7/29	8/25	24	16	2	0.13	8	50
M e a n s				-	-	-	1.10	-	36

*Not included in computation of means.

TABLE 4

GROWTH OF SEEDLING-ORIGIN RIBES ON BURNED PORTION (ABOUT 1.5 ACRES) OF
COW CREEK 5.6-ACRE PLOT

Year of Seedling Origin	Year Seedlings Were Staked	Number of Seed- lings Surviving in 1944	Mean Size of Staked Seedling-Origin Ribes in Feet of Live Stem, on Dates of Inspection as Shown							
			8/30 1937	7/2 1938	8/15 1939	9/24 1940	7/12 1941	6/25 1942	7/2 1943	6/29 1944
1937	1937	68	0.39	1.65	4.05	5.44	8.92	8.74	9.70	10.15
	1938	90	-	0.50	1.18	1.99	3.08	3.37	4.54	4.77
	1939	84	-	-	1.44	2.47	3.98	4.67	6.63	7.72
	1940	33	-	-	-	0.77	1.26	1.55	2.31	2.75
	1941	23	-	-	-	-	0.73	0.85	1.08	1.22
	1942	6	-	-	-	-	-	0.49	0.43	0.54
	1943	11	-	-	-	-	-	-	1.13	1.33
1938	1939	36	-	-	0.69	1.56	2.71	3.82	5.48	6.07
	1940	12	-	-	-	0.51	0.87	1.04	1.77	2.30
	1941	8	-	-	-	-	0.59	0.87	1.38	1.87
	1942	10	-	-	-	-	-	0.29	0.36	0.38
	1943	10	-	-	-	-	-	-	0.41	0.48
1939	1939	5	-	-	0.47	1.75	3.08	5.05	9.67	12.72
	1940	7	-	-	-	0.68	1.44	2.32	3.83	4.30
	1941	1	-	-	-	-	0.67	1.50	2.08	2.25
	1942	4	-	-	-	-	-	0.44	0.69	0.96
	1943	3	-	-	-	-	-	-	0.36	0.50

TABLE 5

SIZE DISTRIBUTION AND YEAR-OF-ORIGIN DISTRIBUTION OF STAKED SEEDLING-ORIGIN RIBES ON COW CREEK
BURN PLOTS

Plot Designation	Date of Check	Size Distributions										Mean Size of Staked Ribes	Year-of-Origin Distribution of Live Staked Seedling-Origin Ribes Plants							
		of Live Staked Seedling-Origin Ribes Plants											1937	1938	1939	1940	1941	1942	1943	1944
		0-4.9"	5"-11.9"	1'-2.9'	3'-5.9'	6'-11.9'	12'-24.9'	25' Plus	Total Ribes Plants											
Burned portion of Cow Creek 5.6-acre plot	8/30/37	50	20	4	-	-	-	-	74	0.39'	74	-	-	-	-	-	-	-	-	
	7/2/38	56	70	33	9	1	1	-	170	0.97'	170	-	-	-	-	-	-	-	-	
	8/15/39	40	111	105	30	6	4	2	298	1.84'	254	38	6	-	-	-	-	-	-	
	9/24/40	46	82	125	57	23	10	1	344	2.54'	282	49	13	-	-	-	-	-	-	
	7/12/41	22	96	126	65	46	17	5	377	3.81'	307	57	13	-	-	-	-	-	-	
	6/25/42**	35	88	130	72	43	18	9	395	4.01'	308	70	17	-	-	-	-	-	-	
	7/2/43**	41	68	119	95	51	30	14	418	4.98'	320	78	20	-	-	-	-	-	-	
Cow Creek 1937 Spot Burn	6/29/44**	36	57	118	96	53	37	14	411	5.54'	316	75	20	-	-	-	-	-	-	
	6/20/39	31	31	5	1	-	-	-	68	6.2"	-	68	-	-	-	-	-	-	-	
	8/21/39*	40	22	1	1	-	-	-	64	5.2"	-	64	-	-	-	-	-	-	-	
	6/22/40	32	61	15	1	-	-	-	109	8.0"	-	109	-	-	-	-	-	-	-	
	9/21/40*	41	51	12	1	-	-	-	105	6.9"	-	105	-	-	-	-	-	-	-	
	6/23/41	25	63	20	3	-	-	-	111	7.7"	-	110	1	-	-	-	-	-	-	
	6/23/42	19	47	42	6	-	-	-	114	12.6"	-	110	4	-	-	-	-	-	-	
	6/26/43	22	48	41	6	-	-	-	117	14.7"	-	106	8	2	-	-	-	1	-	
	6/26/44	14	44	42	12	5	-	-	117	18.9"	-	103	9	2	-	-	-	-	3	

*Fall inspections following spring inspections of same year.

**All known ribes, except 3 current season seedlings in 1942, on study area were staked at time of inspection.

TABLE 6

SUMMARY OF RIBES DATA COLLECTED IN 1944 FROM ONE-ACRE REGENERATION PLOTS

Name of Plot	Date of Check, 1944	Year of Last Ribes Erad.	Total Linear Feet of Estimated Live Stem (a)		Size Distribution of Ribes Plants, Live Stem Classes								Total Ribes Bushes	Fruiting Ribes	Species Distribution of Ribes		
			CSS	OLS	TLS	0-4"	5-11"	1'-2.9'	3'-5.9'	6'-11.9'	12'-24'	25' Plus			Ribes roez.	Ribes nev.	Ribes vis.
Shaver Timber	8/5	1939	(b)	(b)	1596	469	147	120	45	28	29	12	850	10	720	20	110
Blue Canyon	8/4	1940	18	66	84	39	22	27	2	1	-	-	91	-	91	-	-
Pilot Peak	7/26	1940	113	191	304	9	27	39	19	10	4	-	108	1	108	-	-
Signal Peak (c)	6/18	1939	151	757	908	20	49	85	43	35	14	1	247	30	247	-	-
" (f)	9/12	1944	65	125	190	8	16	32	12	4	3	-	75	(e)	75	-	-
Inter-Road	9/1	1943	39	75	114	7	11	9	3	3	1	1	35	(e)	33	2	-
Gentle Gully (d)	9/2	1943	284	323	607	12	88	89	23	16	4	2	234	2	108	126	-
Rock Creek	8/30	1940	32	58	90	54	17	13	5	3	-	-	92	(e)	23	69	-
Paianni Area	8/28	1940	45	29	74	15	4	4	2	2	2	-	29	(e)	29	-	-
Averages	8/21	1941	165	218	382	77	41	42	14	8	5	2	189	(e)	148	27	14

(a) CSS = current season stem, OLS = older live stem, and TLS = total live stem.

(b) These data not collected. Estimated to be 1,146 and 450 in computation of the means.

(c) Data of this line excluded from computations of means.

(d) 67 additional CSS and 69 additional older very small ribes of low vigor also known to be on this plot.

(e) Inspection too late in season to ascertain fruiting, if any.

(f) First post-eradication inspection.

TABLE 7

ESTIMATED AGES OF MAPPED RIBES ON SIGNAL PEAK ONE-ACRE
REGENERATION PLOT

Estimated Years of Ribes Origin	Number of Ribes on Dates of Inspection as Shown*		
	7/27/38	9/14/39	9/12/44
1944	-	-	-
1943	-	-	1
1942	-	-	3
1941	-	-	9
1940	-	-	10
1939	-	9	17
1938	-	15	10
1937	20	15	6
1936	60	22	5
1935	53	14	9
1934	22	10	2
1933	34	3	-
1932	20	1	2
1931	11	1	1
1930	4	-	-
1929	1	-	-
1928	1	1	-
Totals	226	91	75

*The plot received one regular working in 1937, another in 1939 prior to the check of 1/14/39, and a third in 1944 prior to the check of 9/12/44.

TABLE 9

GROWTH RATE OF RIBES OF DIFFERENT YEARS OF ORIGIN ON COW CREEK ENCLOSURE PLOT

Year of Ribes Origin	Relation to Fence	Date of Check	Size Distribution of Ribes Observed on Plots												Total Live Ribes Found	Total Estimated Live Stem, Ft.	Mean Size, Inches of Live Stem
			0-0.9"	1-1.9"	2-3.9"	4-5.9"	6-8.9"	9-11.9"	1'-2.9'	3'-5.9'	6'-11.9'	12'-24.9'	25' Plus				
1941	In	8/13/41	225	163	33	3	-	-	-	-	-	-	-	424	29.8	0.8	
		9/12/42	11	28	46	23	36	9	17	-	-	-	-	170	71.1	3.4	
		9/11/43	1	9	14	7	16	10	32	13	3	-	-	105	153.3	17.5	
		9/14/44	-	1	2	3	2	6	28	27	29	11	1	110	619.8	67.6	
	Out	8/13/41	114	88	15	1	-	-	-	-	-	-	-	218	15.8	0.9	
		9/12/42	6	18	45	28	13	6	6	1	-	-	-	123	46.3	5.9	
		9/11/43	1	1	9	12	12	5	6	-	-	-	-	46	27.6	7.2	
		9/14/44	-	-	5	5	5	7	16	4	-	-	-	42	53.8	15.4	
1942	In	9/12/42	108	39	6	-	-	-	-	-	-	-	-	153	10.8	0.9	
		9/11/43	10	18	15	5	6	1	-	-	-	-	-	55	13.1	2.9	
		9/14/44	-	1	9	9	8	-	21	5	-	-	-	53	67.9	15.4	
		9/12/42	209	83	11	-	-	-	-	-	-	-	-	303	21.8	0.9	
	Out	9/11/43	14	28	16	4	-	2	-	-	-	-	-	64	11.5	2.2	
		9/14/44	2	10	32	6	9	4	3	1	-	-	-	67	26.4	4.7	
		9/11/43	18	1	-	-	-	-	-	-	-	-	-	19	0.8	0.5	
		9/14/44	-	4	10	4	6	1	3	-	1	-	-	29	17.8	7.4	
1943	Out	9/11/43	42	10	2	1	1	-	-	-	-	-	56	4.5	1.0		
		9/14/44	1	10	14	4	-	1	1	-	-	-	-	31	8.5	3.3	
1944	In	9/14/44	58	11	4	-	-	-	-	-	-	-	-	73	4.1	0.7	
		9/14/44	57	25	4	-	-	-	-	-	-	-	-	86	5.8	0.8	

TABLE 10

GROWTH RATE OF RIBES OF DIFFERENT YEARS OF ORIGIN ON CHONCHILLA MT. ENCLOSURE PLOT

Year of Ribes Origin	Relation to Fence	Date of Check	Size Distribution of Ribes Observed on Plots												Total Live Ribes Found	Total Estimated Live Stem, Ft.	Mean Size, Inches of Live Stem
			0-0.9"	1-1.9"	2-3.9"	4-5.9"	6-8.9"	9-11.9"	1'-2.9"	1'-5.9"	3'-11.9"	6'-11.9"	12'-24.9"	25' Plus			
1941	In	8/18/41	569	65	4	-	-	-	-	-	-	-	-	638	22.6	0.4	
		9/15/42	19	48	52	33	16	4	15	10	-	-	-	197	111.9	6.8	
		9/13/43	6	17	21	20	20	24	22	17	15	9	1	172	463.5	32.3	
		9/13/44	-	11	21	16	8	12	39	21	23	11	5	167	738.4	53.1	
	Out	8/18/41	341	63	3	1	-	-	-	-	-	-	-	408	16.0	0.5	
		9/15/42	1	19	28	22	12	12	15	3	-	-	-	112	73.4	7.9	
1942	In	9/13/43	1	7	16	12	19	11	37	8	3	3	-	117	206.9	21.2	
		9/13/44	-	2	9	12	12	11	32	18	12	4	5	117	498.8	51.2	
		9/15/42	62	22	7	2	1	-	-	-	-	-	-	94	8.5	1.1	
		9/13/43	11	8	5	1	2	2	3	1	-	-	-	33	15.3	5.6	
	Out	9/13/44	-	4	8	3	3	1	4	-	2	-	-	25	31.3	15.0	
		9/15/42	168	74	32	9	-	-	-	-	-	-	-	283	28.0	1.2	
1943	In	9/13/43	4	17	26	19	10	5	7	-	-	-	-	88	38.3	5.2	
		9/13/44	-	3	20	26	24	12	27	5	1	-	-	118	105.1	10.7	
		9/13/43	10	4	-	-	-	-	-	-	-	-	-	14	0.9	0.8	
		9/13/44	-	1	1	-	1	-	-	-	-	-	-	3	0.8	3.3	
	Out	9/13/43	21	7	1	1	-	-	-	-	-	-	-	30	3.3	1.3	
		9/13/44	-	1	11	4	1	2	2	1	-	-	-	22	11.8	6.4	
1944	In	9/13/44	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	
	Out	9/13/44	50	12	2	1	-	-	-	-	-	-	-	65	3.7	0.7	

TABLE 11

SURVIVAL OF SUGAR PINE CURRENT SEASON SEEDLINGS PLANTED ON ENCLOSURE PLOTS

Plot Name	Relation to Plot Fence	Year of Planting	Type of Shade, or Other Protection	Vigor Distribution (d) of Sugar Pine Seedlings																	
				Spring (a)										Summer (b)							
				D	VP	P	F	G	E	T	D	VP	P	F	G	E	T	D	VP	P	F
Cow Creek Enclosure Plot	Inside	1943	Lath trough	-	-	-	-	2	2	4	-	-	-	-	1	3	4	1	-	-	-
			Small tin can	-	-	-	-	1	3	4	-	-	-	-	1	3	4	-	-	-	-
			N side of log	-	-	-	-	1	1	2	-	-	-	-	-	2	2	-	-	-	-
		1944	Pot stake only	-	-	-	-	10	-	10	-	1	2	7	-	-	10	2	-	-	-
			Small tin can	-	-	-	-	10	-	10	-	1	1	2	6	-	10	2	1	3	-
			#2 1/2 tin can	-	-	-	-	10	-	10	-	-	1	4	5	-	10	1	-	-	-
Chowchilla Mt. Enclosure Plot	Outside	1944	Lath trough	-	-	-	-	10	-	10	-	-	*1	-	5	4	10	1	-	1	-
			Lath trough	-	-	-	-	10	-	10	-	-	-	1	3	6	10	-	-	-	-
	Inside	1943	1x2" stake	-	-	2	-	5	5	12	1	-	-	-	3	8	11	1	-	-	-
			Stake & sm. can	-	-	1	-	3	2	6	-	-	-	1	-	5	6	-	-	-	-
	1944		Lath trough	-	-	-	-	20	-	20	2	-	-	5	13	-	18	*2	-	-	-
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(a) Dates: Cow Creek - 6/10/44; Chowchilla Mt. - 6/13/44.

(b) " " - 7/19/44; " " - 7/25/44.

(c) " " - 9/15/44; " " - 9/13/44.

(d) Abbreviations as follows: D = dead, VP = very poor vigor, P = poor vigor, F = fair, G = good, and E = excellent vigor; T = total live seedlings.

(e) These 10 are all that could be found of the 18 planted in 1943.

* Stem above cotyledons missing, apparently eaten off by rodents.

TABLE 12

FRUITING BUSHES ON BURNED PORTION OF COW CREEK 5.6-ACRE PLOT

Date of Check, 1944	Numbers of Flowering and Fruiting Bushes by Size Classes as Shown							Total Bushes	Total Est. Flowers or Fruits	Mean Flowers of Fruits	Mean Est. Live Stem
	1'- 2.9'	3'- 5.9'	6'- 11.9'	12'- 24.9'	25'- 39'	40'- 59'	60'+				
6/11	3	20	34	35	10	3	1	106	3,934	37.1	14.5
6/28	-	7	22	30	10	2	1	72	1,173	16.3	17.3
7/19	-	7	20	29	10	2	1	69	983	14.2	17.7
9/4	-	3	11	9	6	1	1	31	191	6.2	18.6
9/15	-	1	3	1	2	-	1	8	15	1.9	23.0

TABLE 13

RIBES FOUND IN 1944 on SQUARE-CHAIN BRUSH PLOTS. (NO RIBES WERE FOUND ON PLOTS OF THIS SERIES OMITTED FROM THIS TABLE)

Location and Plot Number	Size Distribution of Ribes						Total Est. Live Stem, Feet	Mean Size Ribes, FTS	Estimated Ages of Ribes, in Years						Species Distribution			
	Estimated Ages of Ribes, in Years								CSS	1	2	3	4	5	6+	R. roez.	R. nev.	
	0- 4.9"	5"- 11.9"	1'- 2.9'	3'- 5.9'	6'- 11.9'	12'+												
Hogan Mt., Sierra N.F.	3	-	2	-	-	-	2	2.6	1.30	-	-	2	-	-	-	-	2	-
	4	2	4	1	-	-	7	3.9	0.56	1	1	4	-	1	-	-	6	1
	5	491	67	32	17	2**	610	241.7	0.40	425	52	101	29	1	-	-	498	112
	6	621	69	37	8	2	737	206.4	0.28	510	142	77	8	-	-	-	307	430
	Tot.	1114	140	72	25	3	1356	454.6	0.34	936	195	184	37	2	2	-	813	543
Fahey Mdw., Stanislaus N.F.	1	-	2	-	-	-	2	0.9	0.46	-	-	-	2	-	-	-	2	-
	2	54	-	-	-	-	54	2.6	0.05	52	-	-	2	-	-	-	54	-
	4	15	2	1	-	-	18	3.8	0.21	14	-	-	-	-	2	2	18	-
	6	-	-	-	-	1	1	9.0	9.00	-	-	-	-	1	-	-	1	-
	8	2	-	-	-	-	2	0.4	0.18	1	-	-	1	-	-	-	2	-
Strawberry, Stanislaus N.F.	9	-	1	-	-	-	1	1.1	1.08	-	-	-	-	-	-	1	1	-
	Tot.	71	4	2	-	1	78	17.8	0.23	67	-	-	5	-	3	3	78	-
	14	-	1	1	-	-	1	1.6	1.58	-	-	-	1	-	-	-	1	-
	16	-	1	1	-	-	2	2.7	1.38	-	-	-	-	1	1	-	2	-
	Tot.	-	1	2	-	-	3	4.3	1.44	-	-	-	1	1	1	-	3	-
Big Silver, Eldorado N.F.	1	-	1	-	-	-	1	1.2	1.17	-	-	-	-	-	-	-	1	-
	10	1	-	-	-	-	1	0.2	0.25	-	-	-	1	-	-	-	1	-
	*13	-	-	1	-	-	1	1.2	1.17	-	-	-	-	-	1	-	1	-
	Tot.	1	-	2	-	-	3	2.6	0.86	-	-	-	1	-	2	-	3	-

*Data from a 1943 inspection.

**One of these (R. roezli) bushes was fruiting.

TABLE 14

PINE REPRODUCTION FOUND IN 1944 ON SQUARE-CHAIN BRUSH PLOTS. (TREES TALLER THAN 40 FT. NOT INCLUDED IN TABLE.
NO PINE REPRODUCTION FOUND ON PLOTS OF THIS SERIES OMITTED FROM THE TABLE.)

Area	Plot No.	Size Distribution of Sugar Pine Reproduction												Total Sugar Pine Trees	Mean Ht. in Feet	Size Distribution of Ponderosa Pine Reproduction												Total Ponderosa Pine Trees	Mean Height, Feet
		Size Distribution of Sugar Pine Reproduction														Size Distribution of Ponderosa Pine Reproduction													
		0"-5.9	6"-11.9	1'-1.9	1'-2.9	1'-3.9	1'-4.9	1'-5.9	1'-6.9	1'-7.9	1'-8.9	1'-9.9	1'-10.9			1'-11.9	1'-12.9	1'-13.9	1'-14.9	1'-15.9	1'-16.9	1'-17.9	1'-18.9	1'-19.9	1'-20.9	1'-21.9	1'-22.9		
Strawberry, Stanislaus N.F.	10	-	-	2	2	2	7	5	5	-	-	21	7.7	-	-	1	2	2	-	-	-	-	-	5	6.2				
	11	-	-	-	1	1	1	1	-	-	3	6.0	-	-	-	-	-	-	-	-	-	-	-	1	3.0				
	12	-	-	1	-	-	2	-	-	-	3	4.1	-	-	-	-	-	-	-	-	-	-	-	-	-				
	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	8	5	7	18	7.8					
	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	4	8	1	14	16.4						
	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	3	8	-	2	13.1						
	18	-	-	3	5	-	-	-	-	-	-	8	2.1	-	-	1	1	-	-	-	-	-	-	2	3.5				
	Tot.	-	-	6	8	10	-	5	5	6	-	35	5.9	-	-	5	7	11	18	6	-	47	12.2						
Big Silver, Eldorado N.F.	1	-	-	-	-	-	-	-	-	1	-	1	8.0	-	-	1	-	-	-	-	-	-	2	7.5					
	3	-	-	1	-	-	-	-	-	1	-	1	1.0	-	-	-	-	-	-	-	-	-	-	-	-				
	4	-	-	-	-	-	1	-	-	-	-	1	5.0	-	-	-	-	-	-	-	-	-	-	-	-				
	5	1	-	1	4	5	5	-	-	-	-	11	3.3	-	-	-	-	-	-	-	-	-	-	-	-				
	7	-	-	1	-	1	5	5	1	-	-	12	7.0	-	-	13	23	26	7	-	-	-	70	3.7					
	8	-	-	-	-	-	-	-	-	-	-	2	5.3	-	-	2	5	5	1	1	-	-	9	4.5					
	9	1	-	-	-	-	-	-	-	-	-	2	2.5	-	-	2	3	3	1	1	-	-	11	3.3					
	10	3	5	2	18	18	18	9	9	7	-	64	5.2	-	-	1	8	8	4	4	-	-	16	6.6					
	11	-	-	-	11	18	18	7	7	5	-	43	6.5	-	-	1	11	10	5	5	-	-	30	7.6					
	12	-	-	3	1	6	6	5	5	5	-	19	7.8	-	-	5	24	7	8	-	-	54	6.0						
	13*	5	4	6	18	13	13	5	5	5	-	64	6.7	**	**	**	**	**	**	**	**	**	**	**	**				
		Tot.	5	5	8	35	54	28	20	1	1	156	5.8	-	-	2	24	43	77	30	16	-	192	5.3					

*Data for plot #13 was collected in 1943; these data not included in totals.

**These data not recorded in 1943.

SECTION II. FIELD WORK IN METHODS OF RIBES ERADICATION FOR 1944

1. Toxicity Tests with Ammonium Sulfamate.

Comparison of results of 1942 and 1943 treatments. Aqueous sprays of ammonium sulfamate had been applied to Ribes roezli on Laurel Creek, Sierra N.F., on July 25, 1943 to continue tests on the effectiveness of this chemical. These plots were checked on July 28, 1944. Comparison of the data in table 15 shows that the 1942 tests were generally more effective than those of 1943. At Laurel Creek the R. roezli were larger and more deeply rooted than those on the Cascade Road plots, and the former site was drier, hotter, and more exposed. The soil at Laurel Creek site was largely granitic and contained less clay than that of the Cascade Road area. Apparently low soil moisture and high soil temperature tend to reduce the effectiveness of ammonium sulfamate as a herbicide. Insufficient data are available from California tests to show the seasonal effect on the toxicity of ammonium sulfamate, but data from 1943 and 1944 tests on R. lacustre (Idaho) indicate that early and late season treatments are more successful than those of mid-season.

TABLE 15

COMPARISON OF 1942 AND 1943 SPRAY AND SOIL DRENCH TESTS WITH AMMONIUM SULFAMATE ON R. ROEZLI (MILACRE PLOTS)

Location and Plot No.	Date Treated	Pounds Chemical	Gallons Water	Percent Ground Covered	Feet Live Stem	Percent Kill	
						Live Stem	Bushes
Cascade Rd. 1/ Plumas N.F. 1/							
1	7/9/42	3	3	80	275	100	90 ^{2/}
2	Do.	5	5	80	275	100	95 ^{2/}
3	Do.	7	7	90	350	100	100
4	Do.	10	10	60	191	100	100
5	9/8/42	3	3	80	330	100	90 ^{2/}
6	Do.	5	5	90	385	100	95 ^{2/}
7	Do.	7	7	90	300	100	100
8	Do.	10	10	90	305	100	100
Laurel Creek Sierra N.F. 3/							
1	8/6/43	2	2	65	1005	80	25
2	Do.	4	4	60	910	100	66
3	Do.	6	4	60	835	100	80
4	Do.	10	7	80	1020	100	100 ^{4/}

1/ Soil may here be described as a gravelly fine sandy loam originating from basalt and metamorphic rock. There was an overstory of mature fir and a fair cover of small limbs and needles on the ground. Ground slope was gentle and westerly. At the time of the Sept. 8 treatment, all ribes on the plots were in full leaf and some ripe fruits remained on the plants.

2/ Down tree across portion of plot. Est. kill not less than figure shown and may have been close to 100 percent.

3/ Plots about 200 yards from Pine Mountain Road on a general SW slope, heavily grazed. Soil deep, fine sandy loam and chiefly granodiorite. Cut-over area with C. cordulatus and 20 to 30-ft. scattered coniferous reproduction.

4/ One feeble sprout appeared by late season; its survival is questionable.

The 7 large rockbound Ribes nevadense treated August 6, 1943 with 1 to 2 quarts of ammonium sulfamate solution (1 1/2 lbs. chemical per gallon water) were checked on July 28, 1944. Treatment involved spraying the tops and then applying the balance of the dosage to the crown. Dosage was apportioned according to the size of the individual plant. All bushes were dead in 1944.

Field tests completed in 1944. Aqueous sprays of ammonium sulfamate were applied as a combination top spray and soil drench to R. bracteosum and R. inerme. Large R. cereum were given a soil drench treatment with ammonium sulfamate. In addition, several amended sulfamate sprays were applied to R. roezli in an attempt to improve the killing action of this chemical. Data for the 1944 sulfamate tests are summarized in table 16.

The R. bracteosum plots are on Tee Creek, Klamath N.F., about 1/4 mile from its confluence with the Klamath River. The R. inerme plots are on the Plumas N.F. close to the LaPorte Road where it parallels a small creek just 0.15 mile above the Egbert house, or 1.6 miles above Cutler Meadow turnoff. Two R. roezli plots on the Plumas N.F. are 300 ft. northwest of the junction of Mooreville Ridge road and the service road leading into the blister rust camp site. Three R. roezli plots on the Sierra N.F. are in the immediate vicinity of the 1943 plots on Laurel Creek. The R. cereum plots are on Sequoia N.F. just above the highway in the first draw on the General Grant side of Baldy Saddle.

TABLE 16

1944 FIELD TESTS WITH AMMONIUM SULFAMATE IN CALIFORNIA. SPRAY
AND SOIL DRENCH DOSAGE TESTS (MILACRE PLOTS)

Location and Plot Number	Date of Treatment	Pounds Chemical	Gallons Water	Ribes Species	Percent Ground Covered	Feet Live Stem
Too Creek, Klamath N.F.						
1	July 15	8	6	bracteosum	90	400
2	Do.	6	6	Do.	85	450
3	Do.	4	4	Do.	80	400
4	Do.	2	4	Do.	60	350
Egbert Place, Plumas N.F.						
1	July 19	2	4	inermis	70	450
2	Do.	4	4	Do.	60	500
3	Do.	6	6	Do.	60	550
4	Do.	8	6	Do.	40	350
Mooreville Ridge, Plumas N.F.						
1	July 21	4	4	roezli	80	650
2 ^{1/2}	Do.	4	4	Do.	80	700
Laurel Creek, Sierra N.F.						
1	July 28	4	4	roezli	90	750
2 ^{2/3}	Do.	4	4	Do.	75	600
3 ^{3/4}	Do.	4	4	Do.	80	750
Baldy Saddle, Sequoia N.F.	Bushes 1 to 34 varying in size from 25 to 600 FLS given crown drench with aqueous ammonium sulfamate (1 lb. per gal. water). Dosage varied from 1 qt. to 3 gals., depending on size of bush. Bush No. 35 (750 FLS) was sprayed on Aug. 2 with 2 gals. of solution.					
1						

1/Treated with sulfamate spray to which was added 150 cc. of glycerine as a hygroscopic agent.

2/150 cc. of glycerine added to sulfamate soln.

3/500 cc. Furfural (0.5%) + phenyl acetylene (0.01%) added to sulfamate soln.

2. Dosage Tests with Diesel Oil.

The results of dosage tests of Diesel oil and oil mixtures and the effect of various dosages on the regeneration of *R. roezli* were again recorded in 1944. A summary of data is given in table 17. Using current season seedlings as a criterion and averaging the results for comparable dosages for the 6-year period 1938-1944, we see that Diesel and SO₂ extract are about equally effective in original kill and in preventing ribes regeneration. Dosages of 3 to 10 gallons per milacre of Diesel oil and SO₂ extract have so far prevented any ribes regeneration either from stored or introduced seed. Conifers well established on these plots at the time of treatment in 1938 have shown no signs of injury. On plots treated with dosages of 0.5 to 2 gallons of Diesel oil, SO₂ extract, and the mixtures of Diesel with crude oil and of Diesel with the SO₂ extract, the number of seedlings appearing has been approximately the same as on control plots.

TABLE 17

RESULTS OF 1938 DOSAGE TESTS OF NEW OIL MIXTURES ON SMALL RIBES ROEZLI BUSHES, CHONCHILLA MT., SIERRA N.F., CALIFORNIA - SUMMARY OF DATA 1938-1944

Plot No.	Dosage in Gals. Per Milacre	Oil Mixture Used	1938		Current Season Seedlings						Total Fruiting Bushes Removed 1939-44	Non-fruiting Bushes Over 1 Yr. old, 1944 Check
			Number Bushes on Plot	Percent Bushes Killed	'39	'40	'41	'42	'43	'44	Total 1939-44	
28	0.5		195	90	15	13	8	7	-	5	48	2
1	1.0		43	93	-	-	-	-	-	-	-	-
2	1.5		105	96	2	-	-	-	-	-	6	-
3	2.0	S02 Extract	55	100	-	2	2	2	-	-	6	1
4	3.0		70	100	-	-	-	-	-	-	-	-
5	5.0		137	99	-	-	-	-	-	-	-	-
6	10.0		94	100	-	-	-	-	-	-	-	-
7	1.0		18	83	1	-	1	-	-	-	2	-
8	1.5		85	96	8	-	-	2	-	-	10	-
9	2.0		76	93	4	-	4	-	-	1	9	1
10	3.0	Diesel Oil	56	100	-	-	-	-	-	-	-	-
11	5.0		59	100	-	-	-	-	-	-	-	-
12	10.0		35	100	-	-	-	-	-	-	-	-
13	1.0		58	71	54	26	15	18	-	-	113	10
14	1.5		94	91	17	9	1	3	-	-	30	1
15	2.0		21	81	9	13	-	3	-	-	25	-
16	3.0	Diesel Oil + Crude Oil	109	100	1	-	-	-	-	-	1	-
17	5.0		110	95	1	8	-	-	-	-	9	-
18	10.0		65	100	-	-	-	-	-	-	-	-
29	0.5		57	100	24	38	1	-	-	-	63	-
19	1.0		77	92	93	46	2	3	-	-	144	4
20	1.5	S02 Extract + Diesel Oil	210	94	22	14	-	-	-	-	36	4
21	2.0		23	96	7	36	-	-	-	2	45	2
22	3.0		46	100	3	3	1	-	-	2	9	1
23	5.0		127	100	-	5	-	-	-	-	5	-
24	10.0		135	100	-	-	-	-	-	-	-	-
25	0.0		209	None	87	41	-	-	2	-	130	69
26	0.0	Control	25	None	137	96	1	3	-	-	237	3
27	0.0		170	None	81	15	7	-	-	8	111	56

3. Brush Chaps as Protective Clothing for Crews Working in Spiny Brush.

The employment of teen age boys has focussed attention on the need for pants or chaps to protect the boys against spiny brush. Ceanothus cordulatus, or whitethorn, has been especially troublesome and has contributed largely to the injuries incidental to work in brush fields. The long standing problem of "getting the men into the whitethorn and keeping the whitethorn out of the men" has assumed new significance with present high school labor.

Whitethorn, sometimes known as Phonograph Needle Bush, occurs in close association with ribes throughout the sugar pine areas of California. This plant commonly attains a height of 3-4 feet and has long spreading branches semi-erect with gray green foliage. The outstanding feature of the plant, from the standpoint of the blister rust crewmen, is its thorns. These thorns average about 1/2 inch in length, are stiff, brittle, fairly sharp, and occur at the ends of short twigs. A person forcing his way through dense clumps of whitethorn may drive the thorns deeply into the flesh, thus causing considerable pain. If the thorn breaks off and becomes imbedded in the flesh infection may set in, incapacitating the man for field work. Compensation cases have been frequent for such injuries.

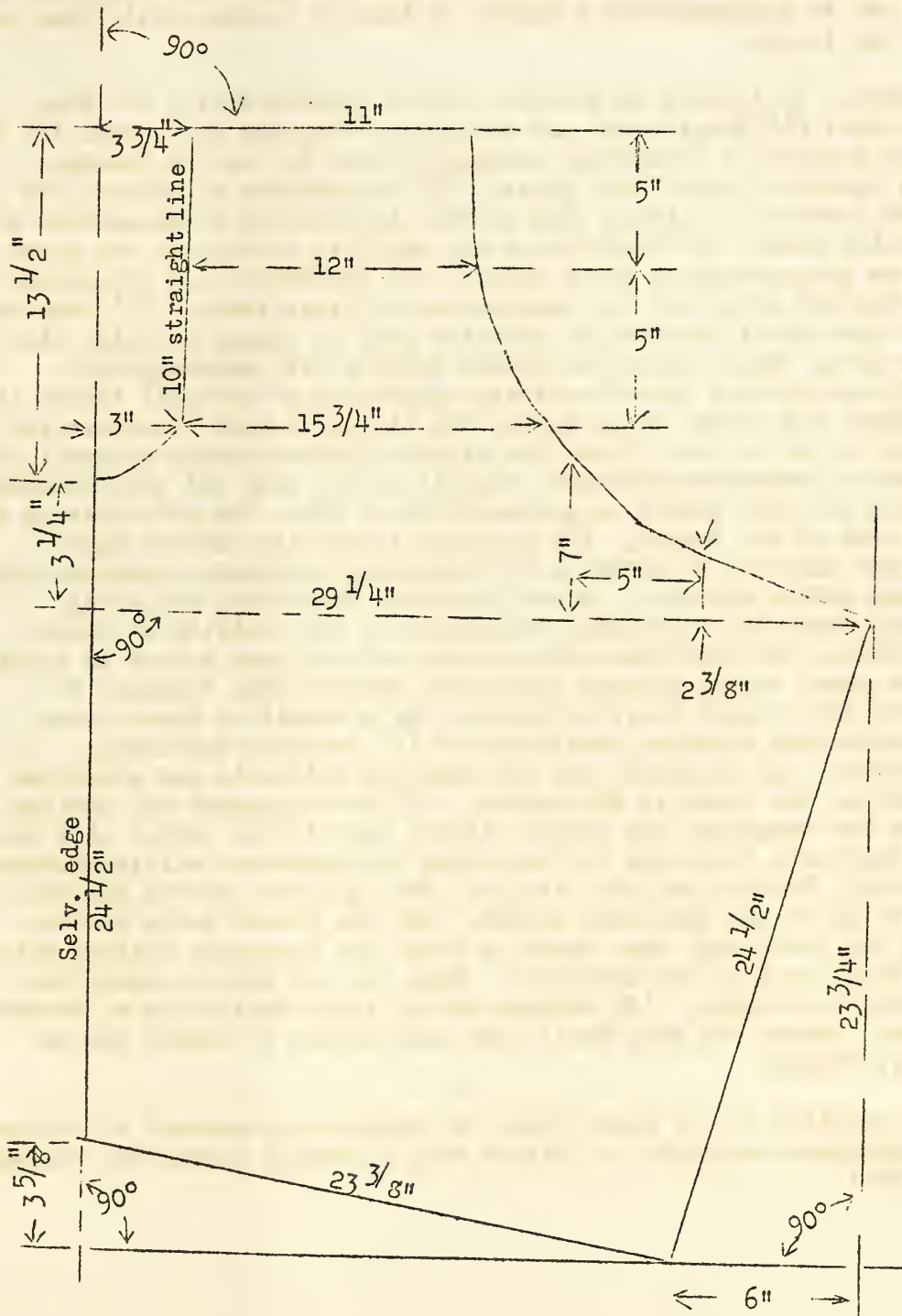
In 1936 Bob Riley designed a chaparajos and fabricated a few pairs from scrap canvas. They were worn and liked by the men, but for some reason their use was discontinued. In 1943, Frank Patty and John Mitchell recognized the necessity for some sort of leg protection for young boys and made a few pairs of chaps. Last winter a new design was worked out, new material purchased, and about 200 pairs of chaps were made up in the Oakland warehouse. These chaps were used for about three months of the 1944 field season by crews in the Sierra National Forest and Yosemite National Park. Workers and supervisors were enthusiastic about the usefulness of this garment in bolstering morale and improving the efficiency of crews working in thick brush.

The garment is essentially a chaparajos consisting of legs and waistband in front and no seat; it is constructed of heavy canvas with suspenders of webb belting or canteen strap material. All seams are firmly sewed and extra reinforcement is added at weak points. The knees being the point of greatest wear are additionally protected by a large rectangular patch. The waistband is made in the form of an elongated belt loop so a belt may be worn if desired. The loose fit and open seat make for comfort on warm days and permit easy movements by the worker.

Three sizes were supplied in the ratio of about 13% large, 80% average, and 7% small. Figure 1 is a dimensional drawing of the leg and front pattern for the average size worker.

Figure 1

DIMENSIONS OF PATTERN FOR AVERAGE SIZE OF BRUSH CHAP



Copied by L.P. Winslow from original drawing by John N. Mitchell 1/4/45.

SECTION III. LABORATORY, GREENHOUSE, AND SPECIAL ACTIVITIES.

The laboratory, greenhouse, and Ribes Garden at Berkeley were actively maintained throughout 1944 without the benefit of part-time assistants. Laboratory and greenhouse facilities at Moscow were used to stratify and to pre-germinate a number of lots of western white pine seed for planting tests.

Special activities at Berkeley and at Spokane during the year have included: (1) Compilation and analysis of disease study data for the purpose of devising a dependable sampling method for use in running a partial check of large field plots. (2) Preparation of reports for the Forest Service on blister rust control in relation to management of western white pine. (3) Compilation and analysis of data on ten years of tests on germination of ribes seeds. (4) Laboratory and greenhouse tests on factors affecting the germination of ribes seeds. (5) Chemical tests for the identification of infection zone in tissue of white pine and sugar pine. Field tests undertaken in July with alphanaphthol on freshly cut cankers showed definite indication of abnormal tissue in both proximal and distal zones beyond the limits of bark discoloration visible to the naked eye. Tests for nitrate (diphenylamine reagent) and for phosphate (ammonium molybdate reagent) in the bark and stem cambium of infected branches showed an accumulation of these two nutrients in the proximal zone of the canker. (6) Toxicity tests with various plant hormones and mixtures of hormones with ammonium sulfamate, ammonium thiocyanate and sodium chlorate. A new technique was worked out using Lemna minor (duckweed) for rapid evaluation of the toxicity of these new herbicides. The more promising herbicides were then tested by treating greenhouse grown barley plants; herbicides showing high toxicity to barley were then tested on ribes plants. As a result of these tests two new herbicidal mixtures consisting of (a) ammonium sulfamate, phenylacetylene and furfural, and (b) ammonium sulfamate and glycerine were tested in the field in California. (7) New equipment was devised and tested for comparing the barium nitrate equilibrium method with the standard sunflower technique for measuring the permanent wilting percentage of soils. Results to date with this new equipment showed agreement within 1 or 2% of the sunflower method. For the forest soils tested, R. roezli has previously been shown to reach the permanent wilting point slightly below that of the sunflower. Thus the new method should meet our requirements nicely. (8) Cooperation in field activities on barberry eradication, control of pear Psylla and eradication of poison oak at Camp Adair, Oregon.

In addition to the above work, the following processed or printed reports were made available to Blister Rust personnel during the calendar year of 1944:

Serial No. 121 - A STUDY OF THE EFFECTS OF AERATION ON THE GERMINATION
OF RIBES SEEDS DURING AND FOLLOWING STRATIFICATION.

.....L. P. Winslow

Serial No. 122 - OBSERVATIONS ON THE REGENERATION OF UPLAND-TYPE RIBES
IN WHITE PINE AREAS OF THE UNITED STATES.

.....H. R. Offord

SELF-INCOMPATIBILITY IN SEVERAL SPECIES OF RIBES IN THE WESTERN STATES.
Jour. Agric. Research 68: 65-71 (1944).

.....H. R. Offord,
Clarence R. Quick, and
Virgil D. Moss

THE EFFECTS OF SNOWBRUSH ON THE GROWTH OF SIERRA GOOSEBERRY. Jour.
Forestry 42: 827-832 (1944).

.....Clarence R. Quick

DAMAGE TO CONIFERS IN NORTHERN IDAHO BY THE RICHARDSON RED SQUIRREL.
Jour. Forestry 42: 143-144 (1944).

.....C. R. Stillinger

NOTES ON CROWARTIUM OCCIDENTALE. Northwest Science, 1: 11-16 (1944).

.....C. R. Stillinger

J. M.
K. J.

WHITE PINE BLISTER RUST CONTROL

IN

CALIFORNIA AND OREGON



UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

610 SYNDICATE BUILDING
OAKLAND, 12, CALIFORNIA

WHITE PINE BLISTER RUST CONTROL

IN

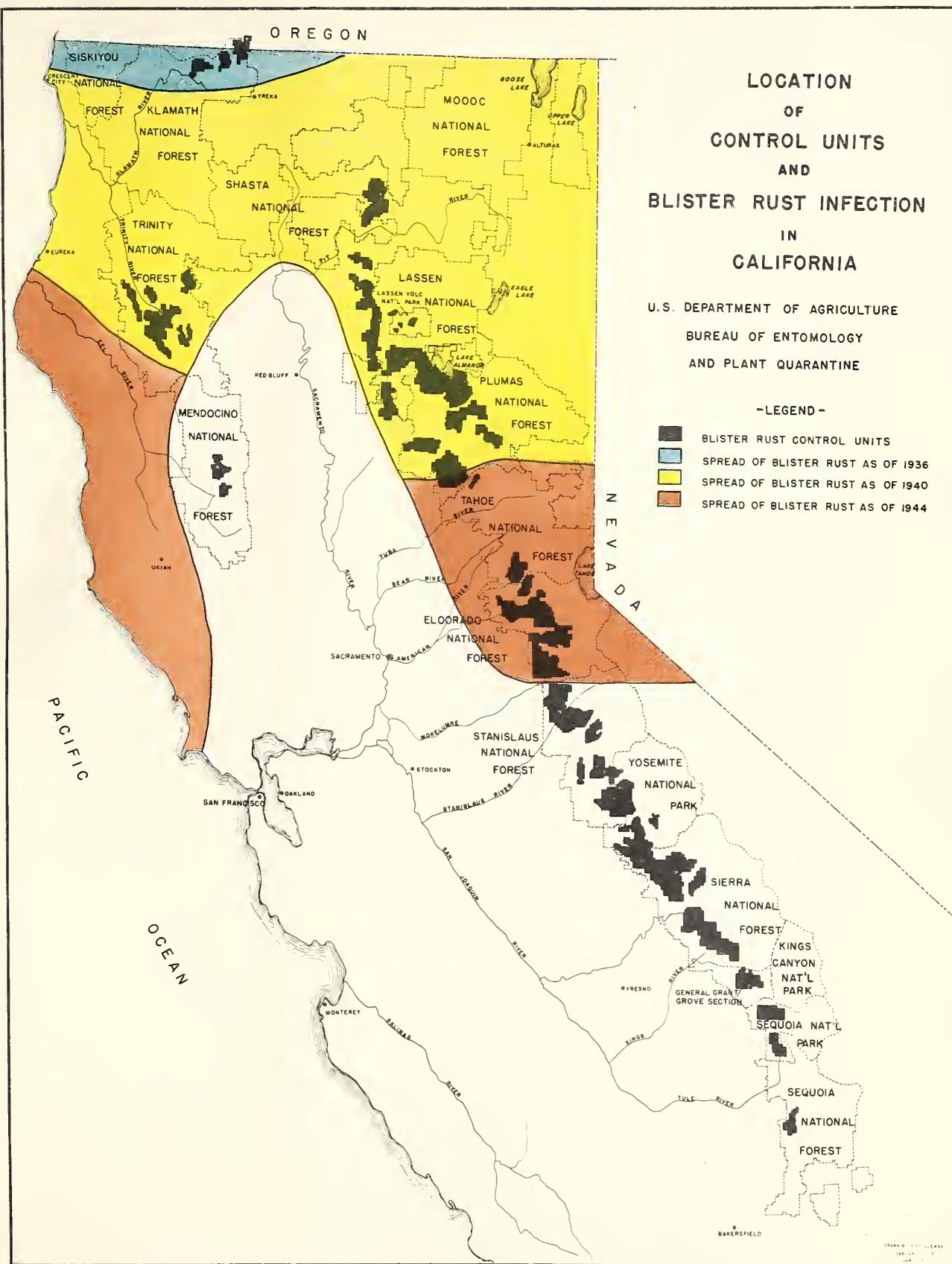
CALIFORNIA AND OREGON

By

W. V. Benedict, Senior Forester,
In Charge of Blister Rust Control in the Pacific Coast Region
and
T. H. Harris, Forester

United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine
Pacific Coast Regional Office
610 Syndicate Building
Oakland 12, California

January 1945



LOCATION OF BLISTER RUST CONTROL UNITS IN OREGON

U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY
AND PLANT QUARANTINE

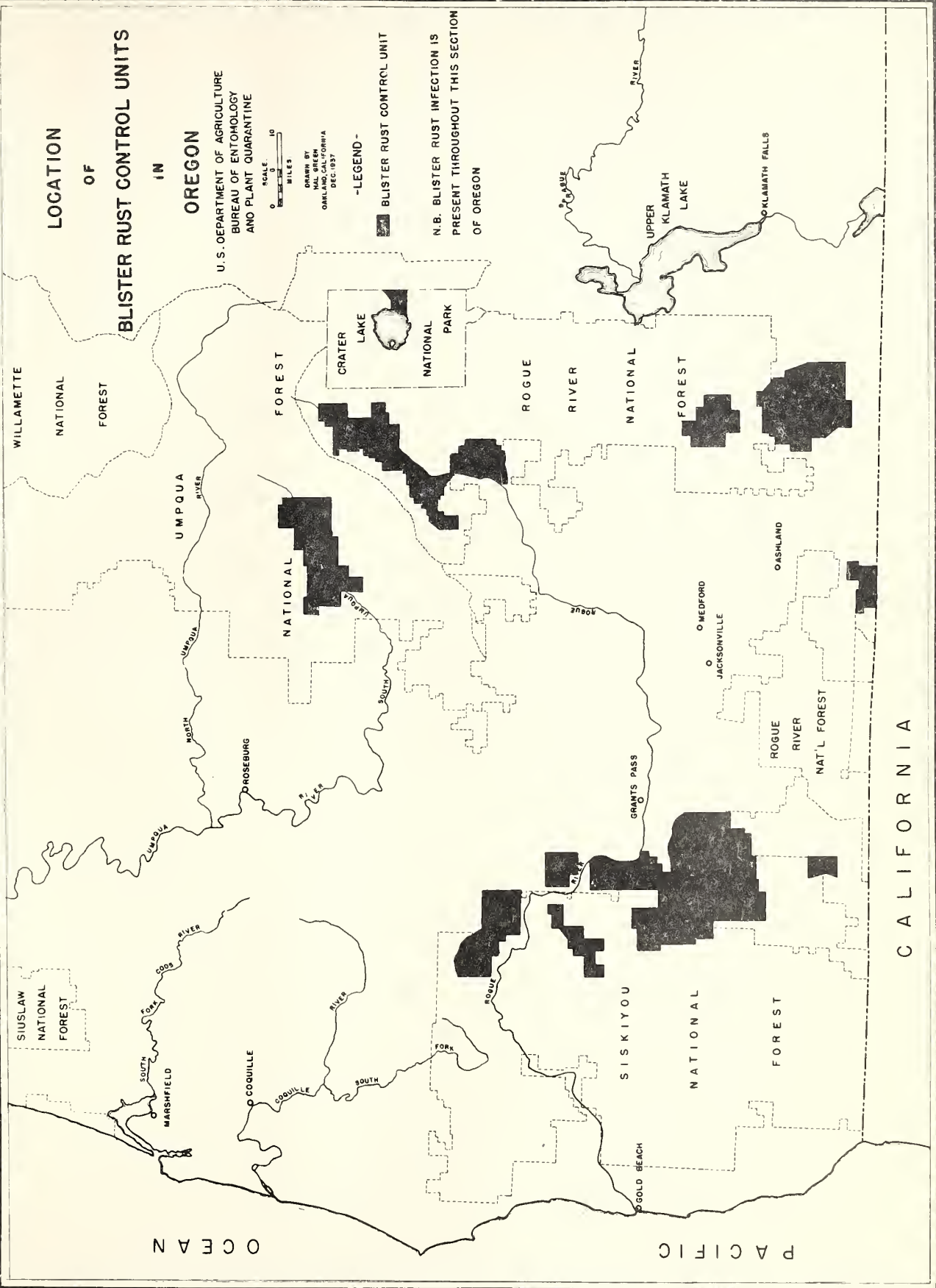


DRAWN BY
WAL GREEN
ORANGE, CALIFORNIA
DEC. 1937

-LEGEND-

BLISTER RUST CONTROL UNIT

N.B. BLISTER RUST INFECTION IS
PRESENT THROUGHOUT THIS SECTION
OF OREGON



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Map of Blister Rust Control Units in Oregon	Frontispiece
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WHITE PINE BLISTER RUST CONTROL IN CALIFORNIA AND OREGON

By

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Agricultural Research Administration
Bureau of Entomology and Plant Quarantine
United States Department of Agriculture

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FACTS ABOUT THE DISEASE

White pine blister rust, a fungus disease that infects and kills five-needled pines, was first found in Europe in 1854. About 1898 it was unknowingly introduced into the northeastern part of the United States, and spreading from this source it has now invaded nearly all the principal white-pine-producing areas in the Eastern States. Infected white pine seedlings, separately introduced from France, were planted near Vancouver, B.C., in 1910, thus establishing the disease in western North America. From this point it spread to the native white pine stands of British Columbia and into northwestern Washington, where it was discovered in 1921. It has steadily advanced southward until it is now established in Washington, Oregon, and California. It also spread eastward into the Inland Empire region of eastern Washington, northern Idaho, and western Montana, and recently was found in Wyoming.

In California the first blister rust infections were found in 1936 at points a few miles south of the Oregon-California State line. The disease has made rapid southward advances in the intervening years, and in 1944 it was found in the Eldorado National Forest on the alternate host plants, currants and gooseberries. This places the southernmost known infected areas in California's valuable sugar pine forests about 240 miles south of the Oregon-California State line.

The fungus lives alternately on the white or five-needled pines and on currant and gooseberry plants, commonly called ribes. It is carried between host plants by wind-borne spores. The spread from infected pines to ribes may exceed 300 miles, but it spreads from ribes to pines in damaging amounts for only short distances, usually not exceeding 1,000 feet. The fungus cannot spread directly from pine to pine; it spreads from pines to ribes and from ribes back to pines, thus making a complete life cycle. On ribes the disease attacks the leaves, and on pines the bark, where it causes the death of the tree by girdling. Control of the disease is obtained by the eradication of all ribes growing in white pine stands and within a surrounding protection zone of about 1,000 feet.

The commercial white pines of Oregon are the sugar pine (Pinus lambertiana Douglas) and the western white pine (P. monticola Douglas). In California

the sugar pine is the commercial white pine. In addition, the foxtail pine (P. balfouriana Murray) of California and the whitebark pine (P. albicaulis Engelmann) of California and Oregon occur at high altitudes and have high aesthetic value in the national parks. All these white pines have important recreational value.

THE PROBLEM

What's at Stake

Sugar pine, one of the most important timber trees in the pine region of California and southern Oregon, is threatened with ultimate complete economic loss by the white pine blister rust. Of some 3,700,000 acres of land on which it grows in California, areas aggregating 2,045,000 acres have been selected as capable of producing commercial crops of sugar pine that will justify the cost of protection against this disease. These areas have been established as control units and now support about 12 billion board feet of sugar pine timber, which is but a partial indication of what the land can produce.

In southern Oregon stands of western white and sugar pine on 527,000 acres have been designated as control units, principally in the Rogue River, Siskiyou, and Umpqua National Forests. Scenic stands of white bark pine on the rim of Crater Lake in Crater Lake National Park are also being protected from the disease.

Ever since the West was settled, sugar pine has been noted and prized for yielding a wood superior for many uses. The qualities of softness, even texture, straight grain, workability, small shrinkage, and durability, which once made the wood sought after for the pioneer cabin and the homestead, now adapt it to pattern making, stair and cabinet work, drainboards, boxes, match stock, wood carving, exterior and interior trim, specialized uses of many kinds, and diversified mill work, especially doors and window sash and frames. In patterns for casting and in models of warships, to name only two among many, sugar pine finds notable wartime uses.

This tree also occupies a unique position in the enhancement of California's recreational and esthetic areas. The National and State parks contain large quantities of white pines, and the maintenance of the forest cover is necessary as one of the essential sources of beauty. In Yosemite, Sequoia, Kings Canyon, and Lassen Volcanic National Parks white pine stands grow in conspicuous locations, and disfigurement and losses by a tree disease would be detrimental to the appearance of these parks. The same may be said of Calaveras and D. L. Bliss State Parks.

Although blister rust attacks and kills white pines of all sizes, the younger trees are killed far more rapidly than the older trees. As young pines form the basis for future crops of timber, the greatest threat from blister rust is the loss of the growing stock. Control of this destructive disease of white pines is necessary to make possible the continuation of lumbering and other industries dependent upon the harvesting of white pine

crops, to prevent the disruption of the economic life of people dependent upon these trees for a living, and to preserve their scenic and recreational value.

Blister Rust When Uncontrolled

Blister rust is an insidious disease that develops slowly but continuously in infected pines. It is not readily visible on pines until 3 or 4 years after infection occurs, and even then the young cankers on the twigs and branches cannot be detected easily by an inexperienced person, even though present in large numbers. By the time the damage from blister rust infection becomes distinctly apparent the tree is generally fatally diseased. Large trees, especially those that have reached merchantable size, may persist for 20 years or longer after infection. The rate of damage is governed by the intensity of infection, which is determined to a large extent by the susceptibility and abundance of ribes in the vicinity of the pines. The most rapid damage takes place on the younger trees.

Pine losses ranging from 1 to nearly 100 percent have occurred in many stands in various parts of the United States because control measures either have not been applied or were not applied until after pine infection had occurred. Heavily infected white pine stands in local areas are numerous in the Northeastern and Lake States and in Idaho, Washington, and Oregon. The number of such stands is increasing in infected areas wherever the ribes host has not been destroyed.

Sugar pine because of its greater susceptibility succumbs more rapidly to attack by blister rust than the other commercial white pines of the United States. In southern Oregon and in northern California blister rust is rapidly killing sugar pines in unprotected stands, and in small infection centers as far south as the Feather River. In the northern part of the sugar pine belt the disease is clearly demonstrating its killing ability.

If blister rust is not controlled, the growing of western white and sugar pines as commercial timber trees will not be possible. Ample evidence illustrating the behavior of the disease in both California and Oregon has accumulated to support this statement. Without control, future crops of white pine timber will not be possible on the $2\frac{1}{2}$ million acres concerned. The region, in spite of the richness of its endowment in coniferous timber, can ill afford the loss of these valuable timber species.

How is Blister Rust Controlled?

Fortunately, blister rust can be effectively controlled. The work already performed on millions of acres of white pine lands in different parts of the country conclusively demonstrates the fundamental method of control to be economically feasible and fully effective. Control methods are based on breaking the life cycle of the fungus through the removal of ribes, the alternate host plants that spread the disease to the pines. Blister rust cannot spread directly from pine to pine. The ribes plants, which are more or less generally distributed throughout western forests, are removed almost entirely by hand.

Control areas are cleared of ribes by laborers working under close supervision. Trained employees then check the areas to make sure the ribes have been reduced to a point that effectively establishes control of the disease. Control areas are reexamined at periodic intervals of from 4 to 6 years to locate areas reinfested with ribes that may have grown from sprouts or from seeds in the soil or from small missed bushes. Such areas are reworked to maintain continuous control of the disease.

Although completion of the initial ribes eradication work will establish control of the disease in the protected areas, rework is necessary to eliminate any regrowth of ribes and to keep the bushes on the decline. This is accomplished by timing the rework so as to prevent the ribes from producing seed. Since the initial work has been done over a period of several years, some of the areas are ready for reeradication work each year. Reworking safeguards the investment already made and maintains the most effective control of the rust. In many control areas one reworking is enough to reduce the number of ribes so low that the areas can be placed on a maintenance basis, that is, they require no more general ribes eradication treatment until the forest cover is disturbed by logging or fire. Others require two or more reworkings. Once these areas have reached a maintenance basis, a relatively small amount of work will be sufficient to maintain control.

In brief, the destruction of the carrier host plants, ribes, within control areas is the method of control. Ribes are destroyed by means of an initial eradication, and are kept suppressed by reworkings timed at appropriate intervals to remove any additional ribes growth that may occur before it can produce seed.

ORGANIZATION OF CONTROL WORK

The Federal Government has taken the lead in blister rust control because of the intrinsic value of the white pines, their importance to the economic welfare of the Nation, and the need for their preservation as an integral part of the forest resources of the United States. Federal authorization for blister rust control work is contained in the Lea Act, a copy of which is appended, and funds to implement this act are carried in the annual Agricultural Appropriation Act. The Lea Act, approved April 26, 1940, authorizes the protection of public and private white pine forests against the white pine blister rust. It gives the Secretary of Agriculture authority to use appropriated Federal funds for the protection of white pine on Federal and other lands, irrespective of ownership, when in his judgment work on those lands is necessary. Also, it authorizes him to use appropriated funds for blister rust control where no Federal lands are involved, when equal sums are made available by State, county, or other local agency, or by the individual owner. This establishes a practical basis for cooperative blister rust control work on State and private lands whereby States and private timber owners may join the Federal Government in sharing the responsibility for protection of non-Federal pine stands.

Control work in California and Oregon has been organized as a joint undertaking by the Forest Service, the National Park Service, the Oregon and California Revested Lands Administration of the General Land Office, the Bureau of Entomology and Plant Quarantine, the States of California and Oregon, and various private timber owners. The Bureau of Entomology and Plant Quarantine is responsible under the Agricultural Appropriation Act for general leadership in the control of blister rust in the United States, and in this capacity represents the people in the planning, development, and coordination of control measures on forest lands of all types of ownership and in the administration of the cooperative control project on State and private lands.

The control work on State and private lands is conducted jointly by the Bureau of Entomology and Plant Quarantine and cooperating State and private owners. The State of California began biennial appropriations for blister rust control work in 1941 and, beginning in 1942, three California lumber companies made financial contributions. These funds were matched with Federal funds and the total sums thus made available were used for cooperative control work on State and private lands. The control work on national forests, national parks, and Oregon and California revested lands is administered by the respective Federal agencies concerned.

In California 57 percent of the control acreage is in Federal ownership and 43 percent in State and private ownership. The control job in Oregon is about one-fourth the size of that in California, and the ownership involved is 68 percent Federal and 32 percent State and private. Therefore the overall job in California and Oregon is 59 percent Federal and 41 percent State and private (Table 2).

The conduct of blister rust control work on a cooperative basis is necessary because of the inextricably intermingled pattern of land ownership in western forests. Control of blister rust can be effective only where the work systematically covers an entire watershed or forest area without regard to ownership boundaries. The nature of the problem is such that control of the disease by each landowner undertaking individual responsibility for work on his land is not feasible where these lands are intermingled in checkerboard fashion. Also, many individual owners of small holdings of sugar pine lands are financially unable and can hardly be expected to contribute to the control campaign. On the other hand, three large forest-landowners in California, the Diamond Match, Michigan-California, and Red River Lumber Companies, have made contributions, and others may be expected to do so. Fundamentally the problem concerns a renewable natural resource of State and national importance reaching across property and State lines, and as such is a matter of public concern and merits prompt public action for the specific purpose of securing public benefit.

TABLE 1

SUMMARY OF BLISTER RUST CONTROL WORK IN
CALIFORNIA AND OREGON IN 1944

Agency Performing Work	Acres Worked		Ribes Destroyed
	Initial Eradication	Rework	
CALIFORNIA			
Forest Service	7,847	18,722	4,000,218
Park Service	1,123	4,248	922,045
Bureau Coop.*	8,873	2,736	2,188,828
Subtotal	17,843	25,706	7,111,091
OREGON			
Forest Service	3,073	4,571	186,494
O & C Adm.**	2,469	126	99,447
Subtotal	5,542	4,697	285,941
PACIFIC COAST REGION			
TOTAL	23,385	30,403	7,397,032

* Cooperative work on State and private lands by the Bureau of Entomology and Plant Quarantine, the State of California, and the Michigan-California and the Diamond Match Lumber Companies.

** Oregon and California Revested Lands Administration.

THE STATUS OF CONTROL WORK

Control Work Accomplished in 1944

During 1944 the Pacific Coast Regional office of the Bureau of Entomology and Plant Quarantine cooperated with Regions V and VI of the United States Forest Service, Region IV of the National Park Service, the Oregon and California Revested Lands Administration, the States of California and Oregon, and the Michigan-California and Diamond Match Lumber Companies in providing planning, technical direction, and coordination of blister rust control work. This included assistance in locating work areas, training field crews, and checking field work to maintain effective control standards and to secure proper application of ribes-eradication methods.

Accomplishments of the several agencies during 1944 are shown in Table 1.

Field operations were adjusted to meet war conditions by using labor outside draft age and not required by war industries or agriculture. Work objectives for 1944 were, first, to take care of the necessary rework on initially protected lands where ribes were regenerating; and, second, to retard rust spread and development by destroying pine infection centers and eradicating ribes in their vicinity. The productivity and general efficiency of the labor employed were definitely substandard, but in spite of this, effective progress was made toward meeting the season's control objectives. Furthermore, owing to the general dearth of experienced woods' workers in the forest districts and the need for their retention on urgent war projects, it was necessary to use the assistance of blister rust crews to an abnormal extent on fire-suppression work. This reduced to some extent the accomplishments in ribes eradication. The war also has effected a sharp increase in logging on lands of all ownerships, particularly private, to meet heavy industrial demands. Since logging causes conditions favorable for seed germination and growth of ribes, this accelerated harvesting has rapidly increased the acreage of cut-over lands that need to be eradicated of ribes.

Total Accomplishments as of December 31, 1944

The amount of control work done in California and Oregon is shown in Table 2 by land ownership.

As of December 31, 1944, initial ribes eradication is 37 percent completed, and the overall eradication job--that is, the initial eradication plus such subsequent rework as is necessary to suppress the ribes--is 22 percent completed.

What Remains to be Done

A large part of the total blister rust control job in California and Oregon remains to be done. Ribes still must be destroyed on unworked areas totaling 1,619,000 acres. Also, the regrowth of ribes on parts of the control areas will necessitate one or more reworkings. The sooner this remaining work is finished, the less will be the damage from blister rust. A better

TABLE 2

STATUS OF CONTROL WORK IN CALIFORNIA AND OREGON BY LAND OWNERSHIP
AS OF DECEMBER 31, 1944

Land Ownership	Acreage of White Pine in Control Units	Acres Worked		Acreage of Control Units Unworked	Number of Ribes Destroyed
		Initial Eradica- tion	Rework		
CALIFORNIA					
National Forest Land	884,272	289,780	194,918	594,492	69,043,156
National Park Land	283,912	85,514	17,142	198,398	18,804,104
State and Private Lands	876,735	336,521	166,544	540,214	62,061,909
Total	2,044,919	711,815	378,604	1,333,104	149,909,169
OREGON					
National Forest Land	225,127	89,441	29,545	135,686	16,751,772
National Park Land	3,782	3,632	350	150	143,592
O&C Revested Land	129,709	38,776	90	90,933	734,562
State and Private Lands	168,175	108,575	13,232	59,600	2,049,522
Total	526,793	240,424	43,217	286,369	19,679,448
PACIFIC COAST REGION					
National Forest Land	1,109,399	379,221	224,463	730,178	85,794,928
National Park Land	287,694	89,146	17,492	198,548	18,947,696
O&C Revested Land	129,709	38,776	90	90,933	734,562
Subtotal FEDERAL LANDS	1,526,802	507,143	242,045	1,019,659	105,477,186
STATE and PRIVATE LANDS	1,044,910	445,096	179,776	599,814	64,111,431
Total	2,571,712	952,239	421,821	1,619,473	169,588,617

idea of the size of this job is obtained by scheduling the remaining work according to the acreage of initial eradication and reeradication that would have to be worked annually over a 9-year period as shown in Table 3. If carried out according to such a schedule the big job of control would be completed and only maintenance work would remain. A plan of this kind should not be thought of as inflexible. As more facts become known about the behavior of blister rust in California and southern Oregon and its rate of spread, the time required to control the disease within the areas chosen might be either lengthened or shortened.

The Job Remaining on Federal Lands

The annual Federal agricultural appropriation acts and the Lea Act give clearly defined authority to the several agencies of the Departments of the Interior and of Agriculture to conduct programs of blister rust control on lands for which they are responsible. Under the leadership and technical direction of the Bureau of Entomology and Plant Quarantine these agencies have undertaken work as shown in Tables 1 and 2, but much remains to be done. Large stands of white pine are still unprotected in the national forests, the national parks, and on Oregon and California revested lands. The protection of these stands within a period of 9 years would require the eradication of ribes on 369,460 acres annually, of which 113,220 would be initial work.

The Job Remaining on State and Private Lands

Responsibility for the protection of State and privately owned pine stands is divided between the Federal Government and the landowners. The Bureau of Entomology and Plant Quarantine in cooperation with the States and private owners organizes and coordinates the control work, furnishes technical advice and supervision, and conducts the cooperative field work. There remain about 600,000 acres of State and privately owned white pine lands on which no work has been done, plus a large acreage requiring rework. The protection of the white pines on State and private lands in California and Oregon within a 9-year period would require the eradication of ribes on 175,590 acres annually, of which 66,670 acres would be initial work.

Time is the important factor in putting such a plan of work into effect, and blister rust is proving especially virulent in sugar pine stands. In California the Sierra gooseberry is one of the most susceptible ribes and is well distributed in control areas. The rust is already present in its introductory stages in the Sierra Nevada as far south as Amador County, and can be expected to intensify and to continue its southward advance. If the disease is to be controlled economically and effectively, large-scale control must be undertaken as soon as possible. Too long a delay will result in the establishment of rust in all major pine stands with a consequent increase in the cost and in the technical difficulties of control.

TABLE 3

CONTROL WORK REMAINING TO BE DONE
IN THE PACIFIC COAST REGION

Land Ownership		Acres of Initial Work Remaining	Acreage That Would be Worked Annually Over a Period of 9 Years	
			Acres of Initial Work	Acres of Rework
CALIFORNIA				
Federal	Forest Service	594,492	66,000	175,100
	Park Service	198,398	22,000	31,300
	Subtotal	792,890	88,000	206,400
State and Private		540,214	60,000	103,700
T o t a l		1,333,104	148,000	310,100
OREGON				
Federal	Forest Service	135,686	15,100	30,900
	Park Service	150	20	150
	O & C Adm.	90,933	10,100	18,790
	Subtotal	226,769	25,220	49,840
State and Private		59,600	6,670	5,220
T o t a l		286,369	31,890	55,060
PACIFIC COAST REGION				
Federal	Forest Service	730,178	81,100	206,000
	Park Service	198,548	22,020	31,450
	O & C Adm.	90,933	10,100	18,790
	Subtotal	1,019,659	113,220	256,240
State and Private		599,814	66,670	108,920
T o t a l		1,619,473	179,890	365,160

SUMMARY

The white pine blister rust, an exotic forest-tree disease introduced into the United States about 45 years ago, is widely distributed in the white pine-growing regions of the East, the Lake States, and the Pacific Northwest, and is now invading the white and sugar pine stands of California and Oregon. Although slow in its action, it is extremely destructive, killing white pines wherever it becomes established and, unless controlled, rendering impossible the production of commercial crops of white pine timber. Blister rust is effectively controlled by the eradication of currant and gooseberry plants within infecting distance of white pines.

California and Oregon are distinguished by having within their borders the entire range of sugar pine, 2,500,000 acres of which have been included in blister rust control areas. Sugar pine is one of the most important timber trees of the West and yields a superior wood sought for many special uses. Other native white pines in the region that occur in some of the control units are the western white pine, whitebark pine, and foxtail pine. All the white pines in California and Oregon have great aesthetic and recreational value, and the sugar pine, in addition, has high commercial value.

The Federal Government has taken the lead in blister rust control because of the value of the white pines, their importance to the economic welfare of the Nation, and the need for their continued preservation as an integral part of our forest resources. Through the Lea Act the Federal Government has provided enabling legislation that makes possible the control of blister rust on lands in public and private ownership. This legislation has been implemented through the appropriation of funds in the annual appropriation acts of the U. S. Department of Agriculture. The Bureau of Entomology and Plant Quarantine is responsible for the overall leadership, technical direction, and coordination of the control program, and for the conduct of work on State and private lands in cooperation with the landowners. The Federal Forest Service, the National Park Service, and the Oregon and California Revested Lands Administration are responsible for the conduct of control operations on the public lands under their jurisdiction.

At the end of the 1944 season, initial ribes eradication in California and Oregon was 37 percent completed, and the total control job, including such successive reworkings as are necessary, was 22 percent completed. If severe white pine losses are to be averted, the remaining initial eradication and reeradication of ribes on lands in all ownerships should be completed as soon as possible. In northern Idaho some of the unprotected white pine stands are ruined by blister rust. Large tracts have had to be abandoned because most of the young white pine growth had already been destroyed by the rust. The same situation is sure to develop in southern Oregon and California unless prompt protection is given to the even more susceptible sugar pine stands.

The Lea Act, named after its author, Congressman Clarence F. Lea of California, gives authority to the Federal Government to undertake control work on lands of all ownership; provision is made for cooperation with the states and private timber owners. The text of the Act is given below.

(PUBLIC -- NO. 486--76th CONGRESS)

(CHAPTER 159--3D SESSION)
(H. R. 3406)

AN ACT

For forest protection against the white-pine blister rust, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That to promote the stability of white-pine forest-using industries, employment, and communities through the continuous supply of white- and sugar-pine timber, the Secretary of Agriculture is authorized in cooperation with such agencies as he may deem necessary to use such funds as have been, or may hereafter be, made available for the purpose of controlling white-pine blister rust, by preventing the spread to, and eliminating white-pine blister rust from, all forest lands, irrespective of the ownership thereof, when in the judgment of the Secretary of Agriculture the use of such funds on such lands is necessary in the control of the white-pine blister rust: Provided, That in the discretion of the Secretary of Agriculture no expenditures from funds provided under this authorization shall be made on private or State lands (except where such lands are intermingled with those which are federally owned and it is necessary in order to protect the property of the United States to work on those parts of the private or State-owned lands that immediately adjoin Federal lands) until a sum, or sums, at least equal to such expenditures shall have been appropriated, subscribed, or contributed by State, county, or local authorities or by individuals or organizations concerned: Provided further, That no part of such appropriations shall be used to pay the cost or value of property injured or destroyed; And provided further, That any plan for the control and elimination of white-pine blister rust on lands owned by the United States or retained under restriction by the United States for Indian tribes and for individual Indians shall be subject to the approval of the Federal agency or Indian tribe having jurisdiction over such lands, and the Secretary of Agriculture may, in his discretion and out of any moneys made available under this Act, make allocations to said Federal agencies in such amounts as he may deem necessary for white-pine blister-rust control and elimination on lands so held or owned by the United States, the moneys so allocated to be expended by said agencies for the purposes specified.

Approved, April 26, 1940



Girdling action of limb and trunk cankers caused by white pine blister rust on a young pine tree.



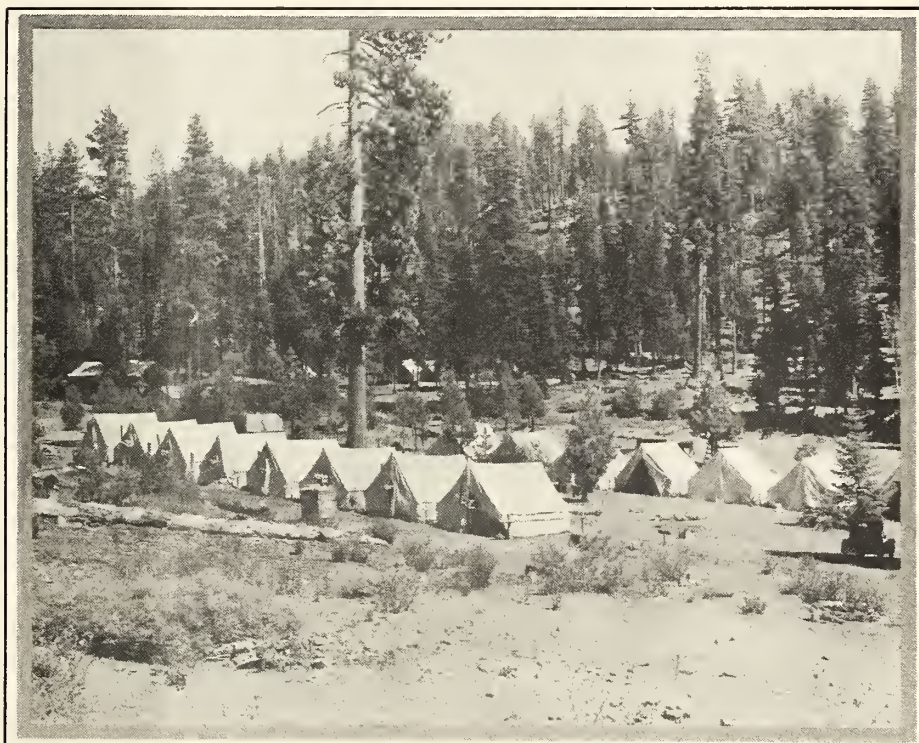
Sugar Pine — A Giant of the Forest.
Ribes eradication will insure its protection
against blister rust.



This is what White Pine Blister Rust does
to a young sugar pine. Note the defoliation
and the broken top, both the result of the
disease.



Sugar pine forms a large part of this magnificent virgin forest.



Blister Rust Control work is accomplished by labor camps centrally located in the best pine-growing districts. This camp is in the Stanislaus National Forest of California.

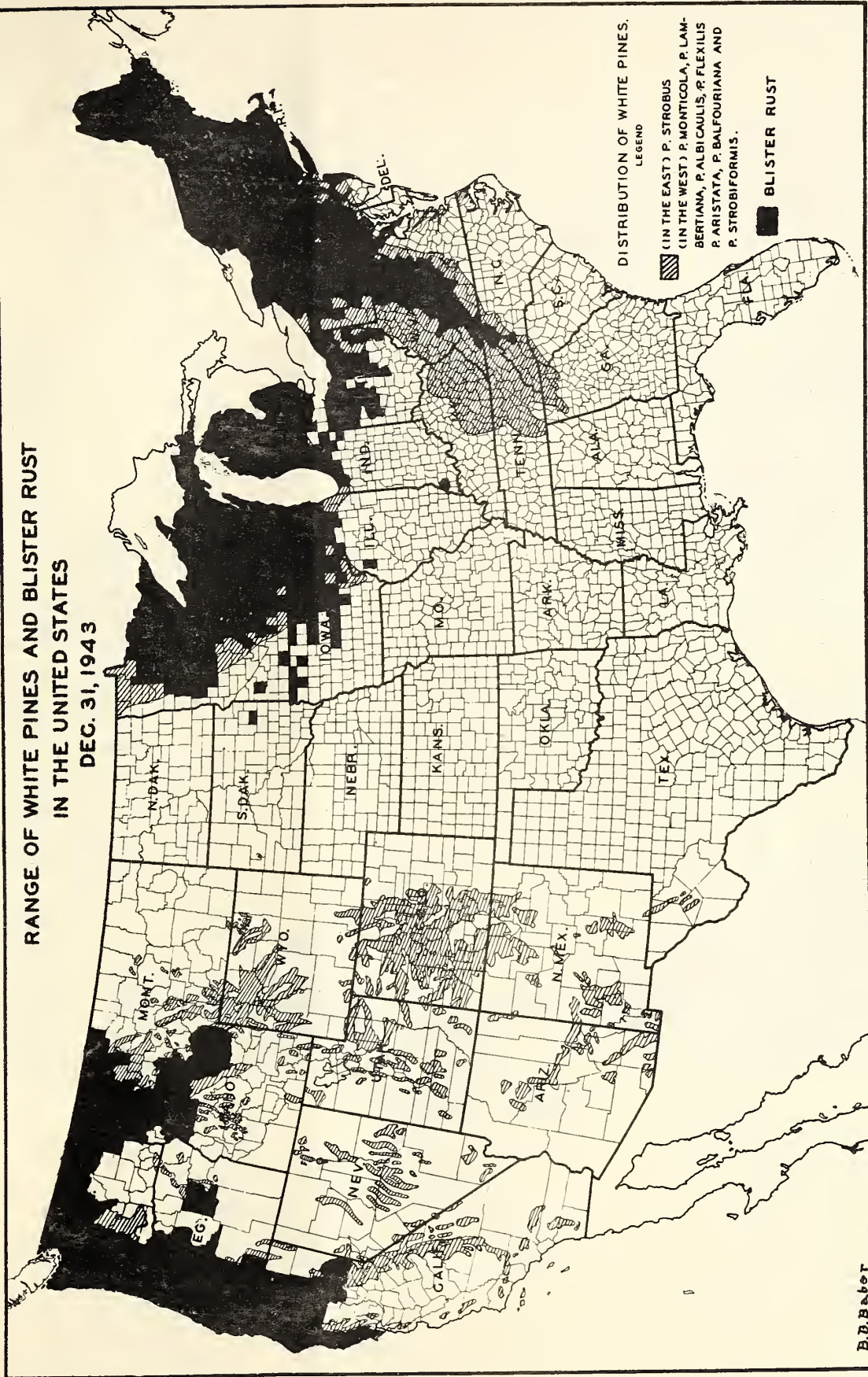


The eradication of currants and gooseberries is effected largely by hand labor. The string bounds the worked area.



Dense concentrations of currants and gooseberries are destroyed by chemicals or by specially equipped tractors.

**RANGE OF WHITE PINES AND BLISTER RUST
IN THE UNITED STATES
DEC. 31, 1943**



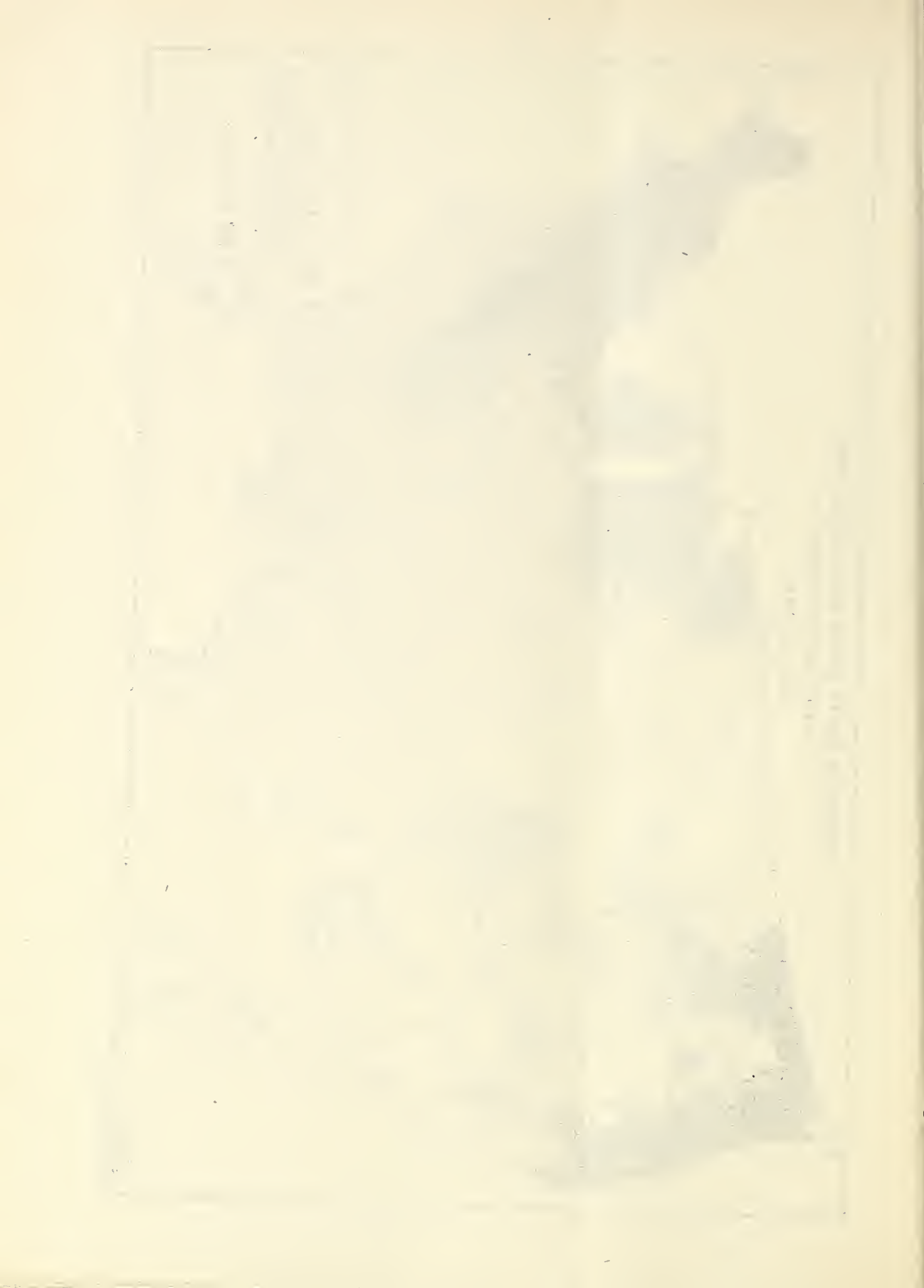
DISTRIBUTION OF WHITE PINES.
LEGEND

(IN THE EAST) *P. STROBUS*
(IN THE WEST) *P. MONTICOLA*, *P. LAMBERTIANA*, *P. ALBICAULIS*, *P. FLEXILIS*, *P. ARISTATA*, *P. BALFOURIANA* AND *P. STROBIFORMIS*.

■ BLISTER RUST

B.D.B. 607

U.S. DEPARTMENT OF AGRICULTURE



HOW BLISTER RUST SPREADS.

